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Original Contributions.

PULP DEGENERATION.

BY EUGENE S. TALBOT, M.S., D.D.S., M.D., LL.D., CHICAGO. READ BEFORE THE SECTION ON STOMATOLOGY, AMERICAN MEDICAL ASSOCIATION, JUNE, 1904.

There are two forms of pulp degeneration, physiologic and pathologic. The physiologic is along the line of evolution and under the general law of economy of growth or use and disuse of structures. It was discussed in a paper, "The Evolution of Pulp" (DENTAL DIGEST, May, 1903, p. 584), where it was shown that structures nourishing the placoid scales are larger than the scales themselves. Later, in some sharks, toothed birds, elephants, etc., the circumscribed pulp is as large as the tooth; in the horse and cow it is smaller, while in the anthropoid apes and man the pulp grows smaller and smaller until in adult life the apical end is so small that only one or two small arteries and nerves enter the root of the tooth. I demonstrated the vasomotor system of the pulp with nerve endings in a paper on the "Vasomotor System of the Pulp," still later, in "Constitutional Causes of Tooth Decay" (DENTAL DIGEST, December, 1903, p. 1434). I also demonstrated nerve degeneration and inflammation resulting in abscess of the pulp by disease of the body in connection with the vasomotor system and nerve degeneracy.

A pulp with such a record as I have demonstrated could hardly avoid pathogenic degeneration. Scarcely a pulp is exempt from influences of this, due to diseases of the body, external violence or pathologic changes. In the very nature of events physiologic degeneration must necessarily result in pathogenic degeneration under the law of economy of growth and the struggle for existence between organs influenced by bodily defects. Before taking up the

different degeneracies the nature of the pulp must be briefly considered.

The number of nerves, arteries and veins entering the apical foramen depends on the age of the individual and the tooth itself. A larger number enters early in tooth development than later in life, when the foramen is exceedingly small. Age and exostosis naturally reduce the size of the opening. Only one or two arteries enter the pulp-chamber from the main trunk. These divide and subdivide, forming many branches and loops.

Because of the small opening at the apical end of the root collateral circulation is impossible; hence with end nerves and arteries the pulp is an excellent illustration of an end organ. This constitutes its susceptibility to disease. The pulp enclosed within bony walls is without an opportunity for expansion in arterial dilation and sclerosis; it has only one or two small trunk arteries and veins for supply and waste. The blood likewise increases disease susceptibility. The vasomotor system makes the pulp respond to any disease to which the general system may be subjected, and diapedesis follows. Thermal changes from without also modify the circulation of the pulp. Sudduth, and later Miller, are of the opinion that there are no lymphatics in the pulp. If they be not present, still the pulp has great predisposition to degeneration, since Wedl, Tomes, Smale and Colyer, and many others, as well as myself, have found large spaces, without walls, whose lymphatic nature has not been determined. That debris and waste products may be carried from the pulp through the veins seems probable.

One influence but little considered in relation to pulp degeneration or tooth structure in general, and one that exerts a marked consequence on tooth decay, is the factor of interstitial gingivitis, abrasion and erosion, which are degenerative conditions that take place at the fourth period of stress, at the senile stage or period of evolution, from forty to forty-five years of age. Not infrequently the senile stage occurs prematurely in neurotics and degenerates. At this period all excretory organs are weakening, faulty metabolism results, and the vasomotor system does not respond quickly. Marked disturbances take place in all the structures of the body, including the alveolar process as well as the pulp. Wedl in 1872 first called attention to the senile condition of tooth structures shown by their discoloration.

Morbid change in the pulp other than nerve-end degeneration, inflammation resulting in abscess, as already discussed, may be summed up as arteriosclerosis, endarteritis obliterans, thrombosis and embolism, cloudy swelling, fatty degeneration, mucoid, colloid, hyalin and amyloid degeneration, pulp-stones, neoplasm and fibroma. Some of these have been discussed by Wedl, Tomes, Smale and Colyer, Hopewell-Smith, Black, Bödecker, Arkövy, Andrews, Römer, Morgenstern, Caush, Latham, and many others, and can be studied more at length in the original monograph. Here it is not

FIG. 1.

Thrombosis of capillaries of pulp and inflammation. ×137. Arteries and capillaries closed. Thrombus. Acute inflammation, showing there has been a hyperemic condition.

my intention to study each morbid condition, but to show that the pulp is susceptible to them (individually and collectively), resulting in tooth degeneration.

Among vascular changes and circulatory disturbances thrombosis in the blood-vessels of the pulp is not uncommon. From the present knowledge of pathology and the pathogenic condition of the pulp it is evident how thrombosis must occasionally result. The pulp, an end organ without anastomosis and collateral circulation, the blood returning through a single vein, creates an anatomic pre-

disposition for formation of a thrombus. The many degenerations and retrogressive changes which take place in the pulp make it susceptible to this morbid state. The spontaneous death of the pulp which sometimes follows disease can be thus accounted for. Formation of different calcic deposits causes the current to become slower and the leucocytes to be retarded in their progress from and to the apical end of the root-canal. In time the blood-plates sepa-

FIG. 2.

Dilated vessel. Diapedesis and embolus. ×280.

rate from the blood-current and are caught at the apical end of the pulp-canal. Sudden blindness occurs under similar conditions. The vessels become injured or abnormal, due to calcic deposits and other retrogressive changes, and stasis takes place, eventually furnishing a basis for future thrombosis and inflammation (Fig. 1).

A thrombus may be located in any part of the arterial system, but more especially the heart. Simple or septic fragments may

become dislodged and be carried through the blood-streams to or into the pulp of the tooth, and, having entered this cavity, their return is almost impossible.

Embolism consists of various structures, such as fat drops, tissue fragments, tumor-cells, air, etc. These follow the blood-current. The size of the body regulates the distance to which an embolus may travel. It stops in vessels whose lumen prevents its passage, and more frequently it is arrested at the bifurcation of the artery. The pulp is especially adapted for this purpose, since it is an end organ,

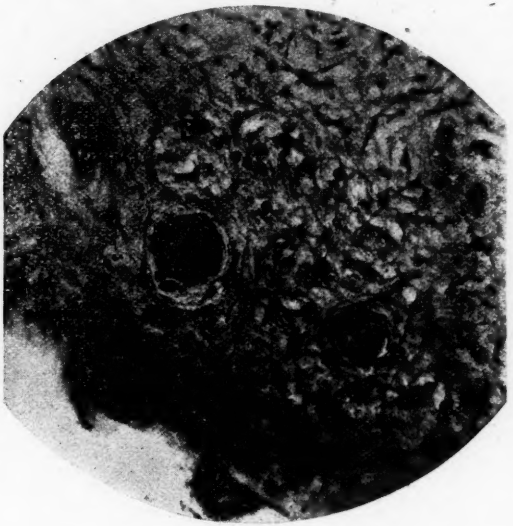

FIG. 3.

The wall in one artery is thickened (endarteritis) and almost occluded by inflammatory products. In the smaller artery the intima contains round-celled infiltration almost occluding it. The pulp-tissues show the myxomatous character very well, branched-spindle and round-nucleated cells in many places. × 225.

with numerous loops terminating in one or more veins for exit.

Emboli, according to Hektoen, act in two ways, mechanically, clogging the circulation, and specifically, depending on the nature of the embolus, whether infected or sterile, whether composed of dead or living cells, capable of further proliferation. The circulation may be mechanically obstructed. If septic material has lodged in a blood-vessel inflammation may extend to the surrounding tissues (Fig. 2).

Endarteritis Obliterans and Arteriosclerosis.—Inflammation of the arterial coats in the pulp is very common. This is due in a degree to pulp embryogeny, anatomy, environment, and to its end-organ nature, as already stated. The diseases most commonly observed are endarteritis obliterans and arteriosclerosis. While it is not uncommon for each coat of the artery to take on a special type of inflammation, yet all frequently become involved.

Endarteritis obliterans is an inflammation of the inner coat of the artery, usually of a chronic type. The inflammation may arise

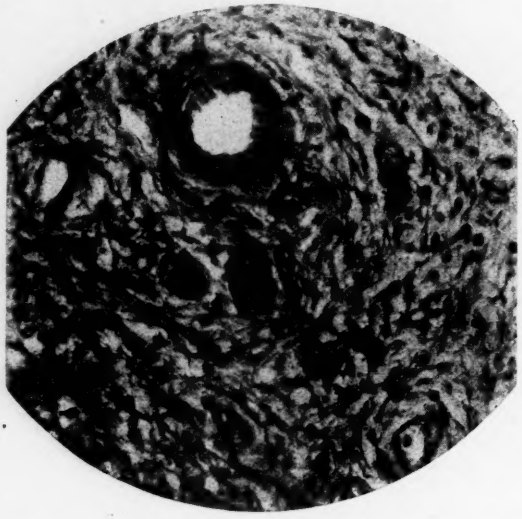

FIG. 4.

An enlarged artery in an early stage of thickening, the small vessels plugged up, well-marked myxomatous pulp-tissue. × 225.

from an irritant in the blood-current from the main current, through the vaso vasorum, or through the lymphatics. The first is the most usual; in the alveolar process all three may occur. In the pulp irritation in the blood-stream is the most common method; proliferation of the endothelium results; bands of fibrous tissue develop; the blood-vessels become obstructed and finally obliterated, impeding the circulation (Fig. 3).

The structure of the pulp, made up of loops of blood-vessels and

situated within bony walls, with only one or two arteries and veins for the passage of blood, renders it a unique end organ, and its arteries susceptible to arteriosclerosis. This, together with endarteritis obliterans, predisposes the arteries to degeneration and necrosis. This is a thickening of the arterial walls, especially of the intima. It is secondary, according to Hektoen, to certain inflam-

FIG. 5.

Pulp-stones scattered throughout, here and there a form of round-celled infiltration, longitudinal nerve-trunks, few degenerated vessels surrounded by hyalin degeneration in the middle of nerve-trunk. Early sclerosis and cloudy swelling or granular degeneration. Odontoblasts *in situ*. × 21.

matory or degenerative changes in the media. This is seldom observed early in life, but is commonly found after puberty, and more frequently at the senile stage, from forty years on. The causes producing arteriosclerosis in other parts of the body produce it in the pulp arteries.

The causes are usually autointoxication and drugs taken into

the system, which likewise become irritants. Besides the distensive force and change in composition of the blood, local irritation of the arterial wall is an active cause. In diseases such as syphilis, gout, rheumatism, Bright's disease, alcoholism and chronic mercurial, lead, brass, arsenic and bromid poisoning, the walls become irritated, resulting in thickening of the arterial coats.

"The inebriate, whose brain and body after death exhibit a confused mass of wreckage, which the pathologist is often unable to trace back to the exact causes and conditions, has, according to

FIG. 6.

Fatty degeneration, acute pulpitis, sclerosis of nerves. Nerve degeneration, dilatation of vessels, faint outline of degenerated odontoblasts. ×137.

Crothers, always sclerotic conditions of the large and small arteries, together with atrophic and hypertrophic states of the heart, kidneys and liver, with fatty degeneration and calcification of the coats of the arteries. These organic changes are so frequently present in inebriates that they constitute a marked pathology which is traceable to the use of alcohol."

These irritants, acting through the vasomotor system and increasing the arterial pressure, finally cause paralysis and diminution of the caliber of the arteries and capillaries, producing stasis of blood (Fig. 4). This morbid state of the arteries tends to produce any or all of the other degenerations previously referred to.

The inflammatory process of the intima was first charged to direct irritation of material floating in the blood. Rokitansky and Thoma are of the opinion that it is secondary and dependent on the degenerative changes of the middle coat. This view I cannot accept, since autointoxic states produce irritation in the blood-streams.

Many degenerations of the pulp are the result of arteriosclerosis, endarteritis obliterans and nerve degeneration. These degenera-

FIG. 7.

Shows pulp-stones and their close relation to the vascular channels. Dilated vessels with amyloid deposit. ×62.

tions occur in connection with each other; in other words, sometimes two, three and even more are to be found in the same pulp. The causes producing them are not understood.

Retrogressive Changes.—One direct result of arteriosclerosis and endarteritis obliterans is cloudy swelling and fatty degeneration. These conditions are observed in connection with such diseases as typhoid fever, septicemia and other acute infectious and toxic diseases. The tissues present a whitish or shiny appearance, without

fibrous structures. Under a microscope the tissues present an opaque mass and do not take stain. The cells are large and swollen (Fig. 5).

"When a tissue, as for instance the heart-muscle, receives a diminished quantity of blood on account of the narrowing of the lumen of the arteries due to thrombosis, embolism or disease accompanied by thickening of the intima, albuminous and fatty changing,"

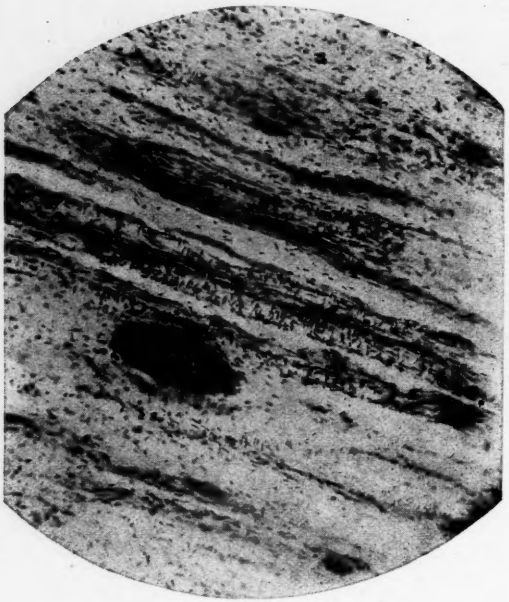

FIG. 8.

Calcareous deposit, medullary nerve. Early connective cell formation. ×225.

remarks Hektoen, "usually result. In the case of the different forms of anemias, degenerations with fat production are found in the liver, heart, kidneys and muscles. In such conditions there are not enough oxygen and other nutritive material to maintain the function of the cells. In actual starvation there is first absorption of all the fat in the body, accompanied by a marked diminution of the structure, and in the later stages albumin and fatty degeneration take place. Albuminal and fatty changes are very common in febrile

diseases. They occur in practically all infectious diseases and in a large number of the intoxications, such as the drug poisons. They are also found in abnormal metabolism, due to direct action of poisons and the abnormal process of oxidation." Owing to the pulp's peculiar structure and environment, fatty degeneration is commonly found in its tissue (Fig. 6).

Amyloid degeneration is a peculiar degeneration of the con-

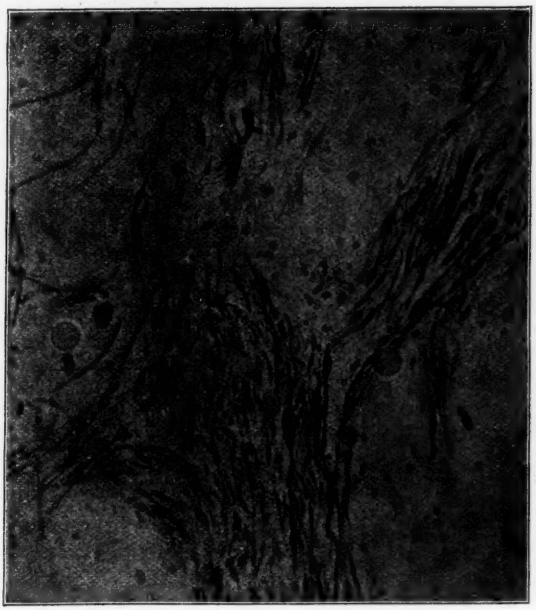

FIG. 9.

This shows medullary nerve-fibres and internodes, axis-cylinders, myelin degeneration. ×280.

nective tissue, causing an albuminous substance to be deposited in the surrounding tissue. The walls of the blood-vessels also become involved. It presents a shiny appearance and differs from other tissues in that it turns a dark red color with iodin. The morbid state is found in syphilis, tuberculosis, chronic dysentery, etc. (Fig. 7). Almost every structure in the body may be involved.

Hyalin degeneration (Fig. 8) is, according to Stengle, closely

allied with amyloid, mucoid and colloid degeneration, and all can pass into each other. It can occur in tissues during infectious and septic processes, following traumatism, in autointoxications such as drug poison, hemorrhages, in cicatrices, in senile blood-vessels, arteriosclerosis, endarteritis obliterans, and in the nervous system. It can also occur in connective tissue which has undergone a change by inflammation. This morbid state depends for its action on local or general nutritive disturbances. The pulp is therefore susceptible to it. The intima, as well as the entire wall of the small

FIG. 10.

Shows medullary nerve-fibres slightly thickened. The connective tissue is degenerating, and hyalin odontoblasts show well on both surfaces. ×156.

blood-vessels in the pulp, easily becomes involved. Some investigators believe that fat connective tissue cells so arrange themselves as to undergo a change into myelin substances (Fig. 9). These ultimately lead to calcification.

This raises the question of calcic deposits or so-called pulp-stones. Pathologists know that tissues elsewhere in the body (which have necrosed or degenerated) are the localities where lime salts are deposited. Dying tissue which has undergone more or less change possesses, according to Ziegler, a kind of attraction for the lime salts in solution in the body. The tissues, to which attention has

been called, are especially susceptible to calcic changes, hyalin and fatty degeneration, tissues involved in disease or drug poisoning, already mentioned here and elsewhere. Regions affected by slight degeneration and in structures like the pulp, a constricted end organ, are predisposed to deposits of lime salts. Calcic deposits have different shapes and locations in the pulp-tissue. Circumscribed structures which appear solid under the microscope, to the naked eye

FIG. 11.
Shows interstitial fibrosis with acute inflammatory cells. Odontoblasts have been destroyed. ×22.

or to the touch are not pulp-stones or calcic deposits, but in a large percentage of cases belong to other retrogressive changes. These deposits (Fig. 10) are no doubt due to degeneration of pulp-tissue, especially in structures undergoing hyaline or fatty degeneration. Large masses of deposits in the form of spherules often occur. Bone formations are sometimes observed. These deposits, both in pulp-

stones and spherules, take on a dirty, bluish-violet color, with hematoxylin. These Dr. Latham and I have observed many times. Crystals may sometimes occur. "This applies, however," as Ziegler remarks, "only to deposits of lime carbonates and phosphates, and not to those of lime oxalate." These deposits may take place at any time, but are most likely to occur at the senile or fourth period of stress.

I shall not consider neoplasm at length in this paper, but will now refer to fibroid degeneration in closing. Fibroid growth of the pulp may be either rapid or slow. Inflammatory reaction in fibrous pulps is rare, although when followed by infection or exposure it may take place. Various degeneracies like those already mentioned are liable to occur, especially those in which connective tissue in general is predisposed. The fibres are observed in bundles, closely packed together, with many connective-tissue corpuscles shown at intervals. Fibroid degeneration is easily distinguished from the other degeneracies of the pulp (Fig. 11).

In these cases the blood-vessels and nerve-tissue are relatively few. The blood-vessels remaining usually have thickened walls, especially in the external and middle coats, which of course narrows the lumen. Not infrequently the blood-vessels are entirely obliterated. These fibromas, very common in exposed pulps, are not now under consideration. In nearly if not all of these degenerations the blood-vessels are first involved, and later the nerve-tissue.

All these degenerations, including the pathologic processes of evolution, are the direct constitutional causes of tooth-decay, erosion and abrasion brought about by diminution of tooth vitality.

THE MAKING OF DENTISTS.

BY GEORGE W. CUPIT, D.D.S., PHILADELPHIA. READ BEFORE THE PENNSYLVANIA STATE DENTAL SOCIETY, AT LIGONIER, JULY, 1901.

The standing of the dental profession, paradoxical as the statement may appear, is in a state of encouraging transition. Fortunately for us and for the profession, when the fathers of dentistry made application some sixty years ago to the medical school of the University of Maryland for the establishment of a strictly dental chair it was refused, and at that time dentistry took a place literally outside of medicine, becoming a separate and distinct profession, and

it has since that time so remained. If this occurrence had not taken place dentistry could not have made the wonderful progress it has in the last half-century. As it stands to-day, a graduate of medicine could no more practice dentistry than could a graduate of a purely dental course practice medicine. I speak from a practical point of view only, not from a legal one. Whether this peculiar relation is to continue indefinitely, and the profession of dentistry, like those of law, medicine and theology, to remain separate and distinct among these her sister professions will be determined probably within the next decade.

So wonderful has been the development of dentistry that it has literally outgrown itself, passing from an experiment, with a few mechanical principles in the primitive tooth-extraction by the barber and the blacksmith, to the condition of to-day, when the intelligent practice of dentistry is the embodiment of the highest degree of art on its practical side and on its theoretical side a great part of the science of medicine.

Under these new conditions, is dentistry to lose herself in the realm of medicine and be marked as simply a specialty of it, or are we, by continuing under the guiding star that marks our progress, to include or incorporate in the ever-expanding course of dentistry the science of medicine also, which shall enable every graduate of dentistry to first obtain the M. D. degree and then that of Doctor of Dental Surgery? I would not imply in this statement that dentistry is to take a position before medicine, but rather that it shall include the art of dentistry and the science of medicine.

These would seem to be very broad statements, and yet if we look over the field to be covered by the dental graduate and practitioner we shall find that nothing short of a knowledge of medicine—the anatomy and physiology; the chemistry and materia medica, with its pharmacology; the study of life in biology; of disease in pathology; its causes in bacteriology, and its treatment in therapeutics—will facilitate the intelligent consideration, understanding and treatment of the pathological conditions of the system resulting from dental lesions and disorders, as well as those of dental disorders resulting from systemic disturbances.

Much has been said and written about the general practitioner's want of knowledge of stomatology, and this is in a great measure true. Time and again have we seen mistakes made by the physician

in treating the simplest lesion of the oral cavity. Once a reputable and intelligent physician argued that the first permanent molar was one of the temporary set, and would be replaced by another tooth. What little knowledge of dental pathology is displayed by the general practitioner in the treatment of the pathology of deciduous dentition, either local or systemic! How seldom does the physician appreciate the importance of oral conditions in the diagnosis of many systemic disturbances!

But these are motes in the eye of our brother; let us look to the beam that is in our own. How many of us are able to recognize catarrh of the stomach or a gastritis where we have symptoms in the mouth indicating such condition, or tonsilitis in its more acute form, or facial neuralgia, and to prescribe intelligently for the relief of them? How many of us care to undertake anesthesia and surgical work, even of a minor form?

To produce dentists of this high standard is "a consummation devoutly to be wished." How shall it be accomplished? The problem is now before us. The selection of material out of which such all-round graduates are to be made is without doubt the vital point in the whole consideration. For the construction of the everyday product of the machine shop all of the material is examined and tested again and again before its acceptance. Can we afford to be any less particular regarding whom we admit into our dental schools for the making of dentists? Shall not the true test of a school be the quality rather than the number of its graduates? The world's need for a continually growing higher standard must be met in dentistry as well as in other fields. It will not do to admit the same poor material and quality of applicant that mark the average list of matriculates in the dental schools of to-day. You might just as well expect to make a mahogany table out of a pine board as to make the broad, scientific, modern dentist out of many of the applicants seeking admission into our schools to-day.

The standard for admission must be raised. Many of the matriculates have apparently never passed out of the secondary grades of our public schools, and are unable to write legibly or to spell correctly. They have never been taught to think or to observe, to reflect or to reason. Mathematics is as abstruse to them as astronomy. Many are foreigners and unacquainted with our language, and need the first and often the second year to master English.

These are some of the adverse conditions with which the colleges have to struggle at present. How can they be expected to turn out in the too short time from such material the scientific dentist that the world demands?

To me the best applicant for the dental course is the graduate of the manual training school. He is equal to the graduate of a high school in general knowledge, besides which he has developed a high degree of manual dexterity. He has a knowledge of mechanics which undoubtedly better fits him for the artisan side of dentistry, and he has a foundation of scientific knowledge upon which a grand superstructure of the science of medicine may be built. His mind has been opened up by his studies and is in a receptive condition. The teacher and most casual observer have noticed the quickness of his perception, and with what facility a pupil of this sort will absorb knowledge. The possession of some previous mechanical training should be one of the requisites in the selection of the dental matriculate.

I was going to say something about a lengthened course or increased number of years of study, but with this accomplished matriculate, unless he decided to take the M.D. degree also, the present course of three years of nine months each would be sufficient. The better the material the shorter the course may be.

The first year could profitably be spent in the practice of dental technics. That the greater part of the practice of dentistry is largely made up of technics is not to be denied. All of the restorative work, either in a single tooth or of the mouth in general, even to the prophylactic measure of thorough cleansing of the mouth and teeth before the real work of restoration begins, is purely mechanical and of this department.

During these procedures the anatomy of the teeth and the mouth is being carefully studied, and here, naturally, the element of observation is brought largely into play and practical use. In this connection the pupil should be taught to cultivate thoughtfulness, and he should not be allowed to slip through automatically, seeing nothing but that which is actually being done. Much more might be said of the qualities of thoughtfulness and observation, but probably as the best means to illustrate their importance I can say nothing stronger than that in the higher ranks of the profession we find the places filled by those who wrought out for themselves these

vital principles, as well as those of mechanics in general, at the lathe or work-bench in the dental laboratory.

The college term is decidedly too short at its best to complete the scientific training even of dentistry—nothing short of a lifetime of careful research and accumulation of the science of dentistry and medicine will complete this masterful side of the general practitioner or the dentist. It is impossible to make scientists in a three years' dental course or in a five years' general course, even though the material of the classes be of the very best. Scientists are developed and not, as was Jonah's gourd, grown in a single night. Let us therefore strive and be content herewith to lay a solid foundation of these scientific principles, and depend upon the years of careful and patient study to perfect the future scientist. Is it not better to sow well a few rudimentary seeds that will take deep root and grow than to set out a great variety of forced and sickly plants that wither away and die? Is not our present system of fads, in merely touching upon all the 'ologies that flesh is heir to, detrimental to healthy growth?

Let us, then, by all the means in our power encourage the new departure of laboratory work, which in its varying forms cultivates the eye, the hand and the brain. Is not this the work of the true scientist, after all? May we not depend rather upon this than upon the fading system of didactic lecture? Not in all the learned professions is there so great a need for laboratory work as in dentistry. We need for the proper study of pathology the pathological laboratory; of bacteriology, the bacteriological laboratory; of chemistry, the chemical laboratory; of materia medica, the pharmaceutical laboratory; of prosthetics, the mechanical laboratory, and we may with advantage add, for the first year's work at least, a laboratory for operative dentistry.

Let me say a few words about the relation of practical knowledge to theoretical. That these two great divisions of learning are separate and distinct, and are ever to remain so, needs for the verity of the statement no argument. The realm of knowledge has had from time immemorial its thinkers and its workers. Every building has its architect and its builder. So it is with dentistry—we have our scientists and we have our operators—or artisans, shall we call them, to better the distinction? Rarely if ever do we see the best of these two classes combined in the one man, and we

probably never shall. As an example of the immutability of natural law I would cite the fact that invariably when the natural artisan is found struggling with science and the born scientist is found struggling with mechanics, it is but a question of a short time when the scientist will cease to operate and the mechanics cease to "science." A very prominent educator and writer of Philadelphia was a poor operator. The best crown and bridge-worker that I know, a perfect artisan, a former jeweler, lacks scientific knowledge. Dentistry has never had these two qualities combined in one individual. The stage never knew a Charlotte Cushman and a Nilsson, nor an Edwin Booth and a Jean de Reszke, combined in one and the same character, and the requirements for one are no doubt entirely wanting in the other. So in the two grand divisions of dental knowledge, the qualities of the artisan are not found in the scientist, and the qualities which make the scientist are not found in the artisan.

An important duty of a dental school and its teachers is to observe the natural tendencies of a student and encourage the development of these faculties by a system of recitations and essays upon the various branches of dental study somewhere in the latter part of the three or four years' course. This would develop those latent talents for scientific study, and open up a new field of usefulness for him in the science of his profession, and the allotted time of his earthly life will be none too long to perfect him on the line for which he may be best fitted.

There is another broad side to this question of making dentists, and that is the relation of the teacher to the student. The work and duty of the teacher are not to go over in a perfunctory manner the methods and principles of swaging plates and soldering; the preparation of cavities and their filling; the diagnosis and treatment of abscess or other pathological condition; the relation of elements in chemistry and metallurgy, or the various descriptions in anatomy and the functions in physiology—these as such are bare, cold and uninteresting facts to the student. But when the teacher opens up the course for the year's work, in whatever branch it may be, by establishing in himself for the students before him a strong bond of sympathy, earnestness and respect, and with every hour of his work, whether it be in one of the laboratories, by the side of the operating chair, or in the lecture-room, gives a full, solid hour of

himself, of his own personality, his sympathy, and his conscientiousness, how the boys flock around and listen to him! How they open up themselves to him and his teachings! How they respect him, and by so doing respect themselves! How the dry facts freshen up into wholesome food for their minds and nourish them! How willingly they strive for knowledge then! Work ceases to be work, and becomes a pleasant pastime, full of interest and profit to both teacher and student. There is not one in a whole class who will not in some measure respond to his kindness and sympathy. Now we are making *dentists!* The school endowed with a corps of such teachers and with such principles is rich indeed.

It has been asked, "What determines the power of a seat of learning? Is it the wealth of material equipment or the spirit of scholarship? Is it the buildings or the brains which make the college or university?" James A. Garfield once said that Mark Hopkins at one end of a bench and himself at the other would be college enough for him. "It is the power of the teacher's personality, his embodiment of the spirit of scholarship, not fine buildings nor great endowments, which give the college power; that spirit which is created by the self-sacrifice and devotion of the men who compose the teaching forces."

A remark was made to me a few days ago by a recent graduate of our school, that one of the teachers from the very first seemed to bear a relationship to him, like one of his own family; that he always felt drawn toward him by kindness and interest. Yet, as I have since learned from that teacher, it was all unconscious on his part, and came no doubt from a normally kind and sympathetic nature. What a power for doing good is a nature like that! How much more may be accomplished in dental or any other training by a teacher of that kind.

Now let us set opposite to this another incident, which happened to the wife of that graduate while having dental work done in a New England town. The dentist was hurting her considerably and apparently unnecessarily, and she remarked, "Doctor, you are hurting me a great deal." He replied, "Oh, I guess I know whether I am hurting you or not; I'm the dentist." She paid her bill for the work and never went into his office again.

Only by a system of broader education can this mental attitude in the dental graduate be eliminated. If we would make of our

graduates dentists who shall be above narrowness, charlatanism, conniving and deceit, we must select men who by liberal education have been raised above such a class; who are honorable and true; whose ambitions point to excellence and fame rather than to the making of money. No better argument could be made for the removal of the charlatan than to admit men who will not become charlatans. A great deal of this, too, depends upon the teacher in the dental school. His influence over a student in his college life is unlimited. Often a few words from one whom the student respects and reveres will change the course of his whole life.

Thousands, I am safe in saying, owe an eternal debt of gratitude to Professor C. N. Peirce, formerly dean of the Pennsylvania College of Dental Surgery, for the many words of encouragement spoken and kindnesses done to them during their college days, upon their graduation, and in subsequent years of practice. All that was done by his many years of lecturing to the classes could not compare with the good that was accomplished by his gentleness, kindness, and fatherliness; his direction of and love for these thousands of students whom he had under his care. They may perhaps forget his teachings, but they will never forget his love and sympathy.

In our making of dentists, let us also strive to make men. The world needs men! The dental profession needs men!—men symbolized by J. G. Holland when he said—

"God give us men! A time like this demands
Strong minds, great hearts, true faith, and ready hands;
Men whom the lust of office does not kill;
Men whom the spoils of office cannot buy;
Men who possess opinions and a will;
Men who have honor, men who will not lie."

DENTAL EDUCATION: A RETROSPECTIVE AND PROSPECTIVE VIEW.

BY JOHN S. MARSHALL, M.S., M.D., SAN FRANCISCO. READ BEFORE THE SECTION ON STOMATOLOGY, AMERICAN MEDICAL ASSOCIATION, JUNE, 1904.

It is my purpose in this short paper to take a hasty retrospective glance at the history of dental education in the United States, that I may hold before you for a moment a picture of progress that

has seldom been equaled in the history of educational advancement, and then to change the view and hold before you another picture, a prospective view, the realization of which will be no more difficult to us and our children than was that of the first picture to our fathers and ourselves. "Past and to come seems best; things present worse." Shakespeare never wrote a truer line than this, for if we were satisfied with the present there would be no progress in the future. Satisfaction with the present brought decay and ruin on the ancient Egyptians and on the Roman Empire.

A Retrospective View.—We learn from history that the art and science of surgery are an outgrowth or evolution of the tonsorial art. Two hundred years ago the barber was also the surgeon. His functions were to shave and cut hair; to bleed the prince or the pauper; to bind up wounds and set broken bones. The striped red, white, and blue pole which stood before his shop indicated that he was ready on occasion to bleed his patron, bind up his wounds, or set his broken bones. The term applied to him was barber-surgeon. His social position was that of a barber, a person to be petted on occasion, or insulted or kicked at the caprice of those of higher social position. To-day his learning and skill have placed him on the highest pinnacle of fame, by reason of which kings and emperors have made him their confidant, and freely and without fear have placed their lives in his keeping.

Dental surgery was likewise evolved from the art of the barber, the tinker, and the village blacksmith. A little over sixty years ago there was no such institution as a dental college, no such organization as a dental society or even a journal devoted to the interests of dental surgery. At that time the only means of education in dentistry was by the old system of apprenticeship. The dentist in those days had no social or professional standing; he was envied by the barber and looked down on by the doctor of medicine. To-day he is regarded as a member of a noble profession, standing shoulder to shoulder with the physicians and surgeons, and dividing with them the honor of adding to the comfort and longevity of the human race by reason of their learning and technical skill.

The evolution of the surgeon from the barber to the scientist required several centuries, while the evolution of the dentist from his low degree to his present honorable position has been accomplished in as many decades. This has been wrought partly by the

energy and forethought of the pioneers in the profession, but principally by the more favorable environment which surrounded the infant profession.

In these days of the rapid spread of knowledge and learning, the development of the arts and sciences and of the inventive faculties, the ignorance, prejudice and bigotry of the race have been swept away, and all men and all movements, either social, political, or scientific, are given an opportunity to develop, each standing or falling according to its merit. Surgery in its early struggles had to fight against the ignorance of the people, the prejudice of the scholars, and the bigotry of the church, and little progress was made until the beginning of the last century. The discovery of the microscope, of vaccination, anesthesia, and antiseptics made it possible for medicine, surgery, and dentistry to reach their present high development, which is still progressing and must continue to advance in the future.

Dental education may be said to have had its beginning in the organization of the first dental college. This institution was incorporated and established in the city of Baltimore in the year 1840. Its entrance requirements were simply a desire to learn. Its curriculum was anatomy, physiology, chemistry, development of the teeth, principles of operative and mechanical dentistry, and laboratory instruction; yet with this meager course of instruction it developed some of the brightest minds that have been found in the ranks of the profession. Its requirements for graduation were—for practitioners of five years' standing one course of lectures of about four months; for students two courses. A reference to the text-books of this period will show how circumscribed and narrow was the field of study, when compared with the text-books of to-day and the requirements for entrance to and graduation from our best dental colleges.

With the organization of other dental colleges in various parts of the country a rivalry sprang up between them, and as the profession advanced in scientific knowledge the curriculum was broadened and the courses extended to five months in each year. For many years thereafter little or no advancement was made either in the course of instruction or the length of the college year. Hydra-headed commercialism had entered into the schools, taken them by the throat, and well-nigh strangled them, for the great aim in most

of them had become large classes and a substantial dividend at the end of the year to be divided among the incorporators.

The organization of dental societies, local, state, and national, and the establishment of dental journals, which followed very soon after the incorporation of the Baltimore Dental College and through the succeeding twenty years, were the most potent elements in arousing the colleges from the stagnation into which they had fallen through the commercial spirit. The might and power of these influences are still exerted for the uplifting and stimulating of the best impulses in education, professionalism, and ethics. To the dental societies and the dental journals the colleges and the profession at large owe much of their success and scientific advancement.

The regulation of the practice of dentistry by the passage of laws for this purpose, by several of the older states, was an advance step of great moment to the interests of higher dental education. These laws recognized dental surgery as a department of medicine, and for the first time in history it was raised to the dignity of a professional calling. The public had heretofore looked on the dentist as a mechanic, spoken of the trade of dentistry, referred to his office as his shop and his operations as jobs, and although the dental surgeon was the possessor of the honorable degree of D.D.S., conferred *en course*, many persons addressed him by his title in the same spirit that they spoke of the barber as "professor" or the chiropodist as "doctor."

Time, however, changed all this, and the public by degrees came to look on dentistry as a professional calling worthy of the best minds and greatest talents. As a result of this change of status in the minds of the public, the dental colleges of this period were overcrowded with students. The demand for more schools seemed imperative, and as a natural result many were organized, too many for the best interests of education. Competition of a commercial character, even more strenuous and active than before, took possession of many of the colleges, and some of the weaker schools, feeling that they were being crowded to the wall, opened their doors to any who could pay the fees, promising to graduate them at the end of two courses of lectures. In many cases students were graduated after one course of lectures, and, to our shame be it said, diplomas were issued in some instances to men who had

attended only a sufficient number of lectures to identify themselves with the graduating class.

The courses of instruction in the dental colleges of this period were so diverse in subjects and study requirements that students had great difficulty in passing from one college to another, as the faculties of the different colleges often refused to give credit for work done in other institutions. This state of affairs became so unsatisfactory to the colleges and students that several of the leading schools issued a call for a conference of all the dental colleges, for the purposes of harmonizing the courses of study and arranging for comity between the schools and such other matters as should be of mutual benefit to all concerned. This conference resulted in the organization of the National Association of Dental Faculties.

The organization of this Association marked a great epoch in the history of dental education, for through its deliberations and established rules it has exerted a tremendous moral influence over the colleges, both within and without the Association. It has kept the colleges within the Association up to its prescribed standards for the admission and graduation of students, while those on the outside have been compelled by the state examining boards to seek admission to the Association and place themselves in harmony with the requirements of its educational standards. It has brought order out of chaos in dental teaching, has harmonized the courses of instruction, and has stopped the practice of granting degrees *in absentia*. It has made it possible for students with proper credentials to finish their course of instruction in any college that they may elect. It advanced the requirements for graduation from two to three years. It established an educational entrance requirement and gradually raised same from nothing to a certificate of having passed the examination of the second year in high school. It has introduced technic teaching in operative and prosthetic dentistry, and has improved and extended the curriculum from time to time by adding such important subjects as physics, embryology, general materia medica and therapeutics, general pathology, bacteriology, comparative dental anatomy, orthodontia, general and oral surgery.

Up to one year ago the minimum preliminary requirement for entrance to our dental colleges was a certificate of having passed

the studies of the second year in high school, and for graduation, three full courses of instruction of from seven to nine months in each year. Until three years ago this was the same standard as that required by the medical colleges. At that time the medical courses were extended to four years and the minimum entrance requirement was advanced to a diploma from a four-year high school. A few of the better class of medical schools now require that the student shall have passed the studies of the sophomore year in liberal arts or natural science, while one insists on the bachelor's degree.

At the present time the minimum preliminary requirement for entrance to the dental colleges having membership in the National Association of Dental Faculties is a certificate admitting the student to the third year of a high school or its equivalent, while those for graduation are four annual courses of instruction of not less than seven months of each year. This, it seems to me, is a record of which the dental profession need not feel ashamed, and yet it should not felicitate itself too much over its progress, for much greater advancement might have been made in educational matters if the colleges could have been united in their work from the beginning.

A Prospective View.—The second picture, or the prospective view, must necessarily be one made up largely of personal opinions and impressions, but nevertheless ones bred of many years of experience and general observation. The great need of the profession to-day and for the future is higher preliminary education and broader and fuller instruction in those fundamental sciences which make up the sum total of a dental education. The profession has done well in the past, but it cannot afford to relax its efforts or to take a backward step, now or ever.

For many years the minimum preliminary educational requirements for entrance to the dental colleges were the same as for matriculation in the medical schools, but at the present time they have fallen somewhat behind. This is a mistake and should be rectified at the earliest opportunity. The requirements for matriculation and graduation in dental surgery should be in no way inferior to the requirements of the medical schools. The courses of instruction in the fundamental sciences should be the same, and during this period the medical and dental students in the great universities should be taught together and no distinction be made between them. By this plan better and more thorough work can be

done and at much less expense. This saving of expense would make it possible to employ teachers, at an adequate salary, who would give their whole time and attention to teaching and original investigation, and as a consequence the teaching would be of a higher grade and the work of the student would be more enthusiastically performed.

What we need to-day and in the future is wide-awake teachers for the fundamental sciences, teachers who are full of their subject and who can impart knowledge in such a fashion that the student cannot help being interested in these, to him, otherwise dry subjects. If the teachers of anatomy, physiology, chemistry, etc., are not enthusiastic in their work the student soon loses interest in those subjects and turns to the more practical ones, to which he often gives time that could be spent to better advantage on the fundamentals, as he finds to his chagrin in after years.

In my work as an examiner for the Dental Corps of the United States army I have found that the majority of the candidates who presented for these examinations were deficient in preliminary education and in those subjects usually denominated as the fundamental sciences. In the practical departments they were as a rule well prepared. The best marks were usually obtained in operative and prosthetic dentistry, crown and bridgework, and orthodontia. In fact, many of them were good jewelers, but lacking in that knowledge which marks the truly professional dentist. This is not the fault of the curriculum, for with the subjects that now comprise the courses of study in our better dental colleges the conscientious, hard-working, well-prepared student will receive an excellent professional education.

The most serious difficulties which the teachers of the fundamental sciences experience in their work are the lack of time properly to cover the subjects and the mental deficiency on the part of a large number of students in every class, whose minds have not been sufficiently trained and disciplined by previous study readily to grasp or comprehend the sciences which they are endeavoring to teach. As a consequence the instructor is obliged to suit his teaching to the comprehension and ability of these students, while those of higher educational requirements, who could progress much more rapidly had they the opportunity, lose interest in the subject for want of a stimulus to study. This fault can be corrected only

by insisting on a higher grade of preliminary educational requirements, and I most sincerely hope that the Faculties' Association will not only raise these minimum requirements to graduation from a four years' high school or its equivalent, at its next session, but will recommend the completion of the sophomore year or a full academic training in the liberal arts or natural sciences as the proper preparation for the study of dental surgery. It is possible at the present time for students of medicine to procure the bachelor's degree in natural science and the degree in medicine by combining the two years' work of the junior college with the four years' work of the medical school. The Universities of Chicago, Michigan, California, and Cornell now offer such courses, both degrees being conferred on the candidate after the completion of his full medical course. This is a movement in the right direction, and I can see no reason why the universities having dental colleges should not offer the same inducements to their students in dental surgery. With such a class of students the work of the instructor would be a joy, while the profession would gain very greatly by the addition to its ranks of a class of more highly educated practitioners.

A young man who has received a college training has usually been taught the principles of social and political ethics, and is therefore better prepared to understand and appreciate professional ethics. Such a man is generally imbued with higher standards of conduct and of living. He recognizes the ethical rights of others and demands that he be accorded the same rights. Such men are seldom guilty of conduct that brings reproach on their profession. They are rarely found in the ranks of the advertising quacks or those who selfishly patent a remedy, an instrument, or an improvement in methods, which would be of benefit to suffering humanity, forgetting or not caring that nearly every remedy they employ for the cure of disease, every instrument they use, or operation they have been taught to perform was thought out and perfected by some member of the profession who preceded them, and who freely and unselfishly gave these to his brethren for the benefit of suffering humanity. The profession needs more of this unselfish, better-educated, truly professional class of men. It needs to stamp out the commercial idea and install in its place the true professional spirit, which places our duty to our patients and the state first, leaving the question of the fee for future consideration.

The lengthening of the college course from three to four years will call out many differences of opinion as to how the extra year shall be employed. Those who teach the practical branches will want to extend instruction in operative and prosthetic technics, while those who teach the fundamental sciences will ask for more time and more thorough courses. The latter, to my mind, is at present the more important side of the question, and it should be given careful and conscientious consideration, for the future of the profession depends on how it is decided. To obtain the highest degree of instruction the teacher must be a specialist in his department, and with the financial inducements that can be offered by the average dental college such teachers for the fundamental sciences are difficult to obtain. Specialists in the practical subjects of dental surgery are plentiful, and as a consequence this part of the training of students leads the theoretical and the scientific.

The student is naturally attracted to those subjects on which he thinks he can see that his future financial success as a practitioner depends. He is therefore inclined, through mental shortsightedness and inexperience in the profession, and from his inability to comprehend its responsibilities and his duties to his patients and the state, to neglect those subjects which are of the greatest importance in the development of scientific dentistry, and hence to the welfare of his patients and the best interests of the state, and to devote his energies to those departments which appear to him to promise the largest and most speedy returns in money for the time and study spent on them.

We are a nation of buyers and sellers. Commercialism dominates our people. Trade and trade interests rule the nation. How, then, can we find fault with the student if he partakes of this spirit of commercialism that he can see everywhere around him, that he reads in the newspapers, hears talked on the streets and in the parlor, sees in the bitter competition of some professional men, and cannot help but know exists in the management of many institutions of professional learning?

The best interests of higher dental education demand that the management of these schools should be taken out of the hands of the individual or the teaching faculties and placed under the control of the state, or of the trustees of our great universities, for the reason that the majority of the dental schools to-day are still per-

force commercial institutions, dependent on the fees of students and the profits of the infirmaries to maintain them and pay the teachers and demonstrators. Just as long as commercialism exists in our system of dental education the best results cannot be obtained. The first dental college was organized on the commercial basis, and I do not know of a single dental school, even among those under state control, that is entirely free from some form of commercialism, for in all of them the fees of the students or the receipts of the clinics bear a more or less important relation, either to the salaries of some of the professors or demonstrators, to the buildings they occupy, or to the apparatus or furnishings.

In most of the state institutions the appropriations are too small properly to conduct the schools, while in the colleges connected with the large endowed universities no endowments have been made to the dental schools. They are thus left in a measure to "work out their own salvation," in many cases "with fear and trembling," as I know from personal experience. We could wish that the legislators of the states having professional schools in their universities would appropriate for their support with a more liberal hand, and that good people with fortunes they cannot spend and do not know where to bequeath would endow the dental colleges and place them above the degrading necessity of catering to the commercial spirit, and entering students who have not a proper educational qualification to begin the study of dental surgery, or who are deficient in that peculiar aptitude for a professional life, through which alone they can hope to develop practitioners who will be an honor to the institutions that are responsible for their education. I have confidence to believe the day is not far distant when all of the dental schools will either be liberally provided for by the state or abundantly endowed through the munificence of a Rockefeller or a Carnegie. The American people are liberal and just towards all educational efforts, and wherever they are convinced that the best interests of the citizen and the state demand that they render financial assistance to any individual enterprise it is usually forthcoming.

Another serious drawback in our system of education is the failure to provide advanced standing in the dental course for students who have taken the bachelor's degree in liberal arts and sciences. These students have had a sufficient amount of didactic teaching and practical laboratory instruction in chemistry, botany,

morphology, physiology, zoology, comparative anatomy, etc., to more than equal the work of the freshman class in the dental schools, and under these circumstances their higher preliminary qualifications should be recognized by advancing them to the sophomore class of the dental course. By adopting a policy of this character ambitious students would be encouraged to complete their academic training before entering on the study of dental surgery. As the matter now stands, the college graduate is placed on the same footing as the student whose qualifications are only those of a second-year course of a high school, and the extra six years of study pursued by him in the languages, mathematics, literature, history, and the sciences count for nothing. This is placing a premium, I was about to say, on ignorance, but I will modify the statement and say, on the minimum requirements for matriculation, and thereby turns away many young men from the doors of the dental schools who would be an honor to the profession.

I am constrained also, from a sense of justice, to make another suggestion, namely, on the matter of advanced standing for medical graduates. Since the adoption of the four-year course for medical and dental colleges there would seem to be no good reason why medical graduates who have taken a full four years' course should not be advanced to the junior grade of the dental colleges. The four years of training of the medical graduate, preceded by a full four years' high school course as a minimum matriculation requirement, are certainly equal to the freshman and sophomore courses of study in the fundamental sciences as taught in the dental schools, preceded by only two years of the high school course as a minimum entrance qualification. It would therefore seem no more than a just recognition of the scientific work performed that he should receive such advanced standing in a dental course. If such students, devoting their full time and energy to the study of the purely dental subjects for two years, cannot make as good operators as their fellows who entered with the minimum qualifications and have spent four years upon the dental course, then the value of higher education as a prerequisite for professional study is a myth and a snare. Let us look at this matter in a reasonable light and place ourselves on record as favoring the proposition of giving due credit for scientific work performed by candidates for matriculation who hold the B.A., B.S., or M.D. degree from colleges and universities of recognized

repute. Scientific knowledge is of as much value to the dental surgeon as it is to the physician and the surgeon, for without the employment of this knowledge in his profession the dentist is nothing more than a handcraftsman.

VALUE OF MODELS IN ORTHODONTIA.

BY MILTON T. WATSON, D. D. S., DETROIT. READ BEFORE THE MICHIGAN STATE DENTAL ASSOCIATION, AT LANSING, JUNE 28-29, 1904.

The value of accurate and artistically made models from an orthodontist's standpoint may with profit be considered as follows: First, their importance as a means of diagnosis; second, their value in aiding one in determining upon a plan of retention after active treatment has been completed; third, as a means of education, both for the profession and the laity, and last, from a medico-legal aspect.

Taking up the discussion under the first heading, it is, in the light of modern orthodontia, a basic principle that accurate models are essentials to an accurate diagnosis, for unlike the physician's patients ours never regain a normal condition when treated in compliance with the demands of an incorrect diagnosis. In cases that are complicated at all it must be clear then that ultimate success depends in no small way upon a right start, which necessitates the possession of good models, and these can be made only from plaster impressions.

The successful retention of a complicated case of malocclusion is next to impossible unless a comparative study is made of the changed conditions with the original, and models made from distorted modeling-compound impressions do not afford this opportunity. The mischief wrought by the malocclusion of the lingual cusp of a single tooth has been sufficient to make disastrous results and heartaches the experience of many a man in his efforts at retention, and the cause of all this trouble has remained unsolved by many, because the habit of carefully studying real models had not been acquired.

The third division is also one of vast importance, but a five minutes' limit on this paper demands brevity condensed. Were it not for the careful study of occlusion outside the mouth of the living patients many of the advances made, not only in orthodontia but in the

fields of operative and prosthetic dentistry as well, would not have been so clearly demanded: neither would the evils associated with the extraction of a limited number of teeth have been so clearly understood were it not for the possibilities afforded us by the study of orthodontia models.

The ability to determine accurately what changes have taken place in the position of the teeth, and in the bony tissues surrounding them, and also the ability to determine what changes came about as a result of the natural forces of mastication after all operative procedure had ceased, are possible only where fine models of the original condition are procured, and are alone ample justification for the expenditure of the time and energy necessary to produce such models.

The impression made upon the patient or parents, when they see a model which is really a work of art, is not without value, and I would also ask you to remember that a man who can make a good model, but who does not do it, is quite likely to be one who will not —even though he can—do a really high-class piece of work in restoring the occlusion to normal.

Under certain favorable conditions work that demands a high degree of skill will command remuneration in proportion, and nothing more surely demonstrates a man to be worthy of the confidence which people must have in him before they are satisfied that he is worthy of his hire, than the possession of a fine collection of beautifully and, with all and above all, accurately-made models. In this age when intensity of purpose stands out so conspicuously in all successful walks of life, nothing short of a high degree of success in the making of models is in harmony with the atmosphere of the modern practice of orthodontia.

The medico-legal consideration presents several points worthy of our attention. Imperfect calcification near the cervical margins is frequently unnoticed by parents until the subsequent decalcification has progressed far enough to demand attention, and at this stage the patient is very liable to attribute the condition to the wearing appliances. What is to me even more important is the fact that these well-made models reveal the conditions of the gums to no small degree. It is by no means difficult, in many cases where a person masticates only on one side, to tell at a glance which it is, for on that side the gums are in much firmer contact around the

necks of the teeth, while on the other the soft plaster used for the impression will readily force itself between the gums and teeth for some distance, depending upon how flabby the former are, and the condition becomes thus clearly revealed in the model. Gums that are diseased and flabby from other causes than disuse are of course equally well shown.

In view of the fact that the legal profession is disgraced by occasional leeches who live, not by the just rewards of honorable and high-class services rendered, but rather by blackmail and bribery to which they resort in order to win malpractice suits, it behooves a man to be ever in possession of accurate models which would be of incalculable value to him were he compelled to face such a suit in which injury to either the teeth or gums was alleged. Furthermore, if an orthodontic operation has succeeded, unappreciative patients can not avoid the payment of just fees by denying the value of the service rendered.

IMPRESSIONS IN ORTHODONTIA.

BY B. ABELL, D. D. S., ALBION, MICH. READ BEFORE THE MICHIGAN STATE DENTAL ASSOCIATION, AT LANSING, JUNE 28-29, 1904.

I am here to-day with a subject which I fear will bore you, not because it is unworthy your attention, but because it is somewhat outside the sphere of the regular practice of dentistry. At the beginning I wish to lay no claim to originality in what I shall present, but say the method used is entirely Dr. Angle's, to whom is due all credit for its inception. In taking of impressions in orthodontia the utmost care is essential. All deposits should be removed and the teeth well polished. The next requisite is a suitable tray, and those designed by Dr. Angle seem to fill the bill satisfactorily. They should be kept perfectly smooth and polished that they may easily separate from the impression. One should be selected large enough to admit of a good body of plaster all around buccal and labial regions. The best plaster I have found so far is French's impression. For an upper impression, mixed to the proper consistency, it should be arranged along the deep portions of the tray and a considerable quantity well out on the handle, leaving the palatine portion nearly bare, as enough will flow over that to get a good impression. In-

serting the tray in the mouth, it should be allowed to rest on the occlusal surfaces of the lower teeth, then with the index finger of the right hand that portion of plaster left on the handle should be wiped up under the lip and into the buccal spaces, and the tray should be brought up till the occlusal points of the cusps of the teeth are very close to the bottom of the tray. This gives a weak line along the buccal cusps where the plaster may be easily fractured for removal. The cheeks and lips should be gently manipulated to expel air when pressing the impression material home, but not drawn down to cause a thinning of the plaster above the tray.

After the plaster is well set the tray should be removed, and the plaster impression left in the mouth. All superfluous particles should be removed with large, loose pledgets of cotton. Next a groove should be cut parallel to the long axes of the cuspids, and the front section pried out with a suitable knife. The buccal and palatine portions are then easily removed, and all the pieces laid on a clean blotter to dry. The small pieces should be placed near where they came away from the larger ones.

The taking of the lower varies from the upper only in that the buccal spaces are filled with plaster before the tray is inserted. The lower tray is held down by the second joints of the index fingers while the tips may be used to work the plaster well down below edge of tray. On removing the lower a good-sized piece will usually be found under the tongue and between the wings of the tray. This should be removed before the tray is and saved to brace the impression when united.

After the impression is thoroughly dry the small pieces are united to the larger ones by a cement made of celluloid, cut with equal parts ether and alcohol. The larger ones are united with wax outside the tray. If care is exercised in trying the pieces together but once the fine serrations will not be rubbed off and the union will be scarcely perceptible.

To obtain a smooth model the impression is first coated with orange shellac varnish. It is desirable that this coat should penetrate the impression deeply for reasons that will appear later. When dry another coat of thin shellac is applied and made to dry quickly to give surface. This coat is followed by a coat of sandarac varnish, omitting to cover the stippled portion of the gums with both second and third coats mentioned. The impression is now ready to

pour, which is done without wetting it, using a good-sized camel's hair brush to sweep the plaster into the pits.

The impression is removed by first carving almost to the coronal surfaces of the teeth, the danger line being the brown color from the first coat of shellac that has penetrated the impression. A groove is next cut down to color on a line parallel with the gingiva and cross-cuts are made, leaving the impression in blocks that are easily pried off with a suitable knife.

The carving of the model next engages our attention, and for those who want artistic effects there are certain rules that we follow more or less closely. We aim as nearly as possible to have the sides represent the malar bones, thus indicating approximately any deviation lateral to normal the teeth may occupy. The height is merely a matter of taste, and is determined by one's sense of "balance."

DISCUSSION.—*Dr. E. C. Moore,* Detroit: Said he could see no great advantage to be gained by the use of French's plaster, as it was very fine and did not set hard like the coarser plasters. He could see no advantage in breaking the impression, as in many cases it was practically impossible to reassemble the pieces accurately.

Dr. Abell explained that the fine plaster sets quicker and gives a smoother surface to the case because it is so fine. The impression in almost all cases has to be broken to be able to remove it from the mouth, as the teeth are so irregular that they will not permit of the withdrawal without fracture. It is also a valuable fact that the fine plaster does not set so hard, as it might be removed without causing much pain. If reasonable care and skill are used the pieces can be put together accurately enough. The impressions should be well dried before they are varnished.

Dr. I. Douglas, Romeo: For making celluloid cement for mending casts, dissolve the celluloid in acetone, as it is better than ether or alcohol. This cement may be profitably used in place of collodion on wounds, etc., like court plaster, to protect from air.

Dr. J. L. Sweetnam, Manistee: I cannot too strongly urge the necessity of making good models and of preserving them for future reference. I recently completed a very difficult case of regulating, but neglected to secure a good set of models at the start. I would gladly give the fee I received for a good set of plaster models of this case before the treatment was begun. The models have greater

value for diagnosing the case and keeping records as the treatment progresses.

Dr. N. S. Hoff, Ann Arbor: Dr. Abell apologized for bringing up this subject, but I want to say that it is one which sorely needs consideration. I am in a position to notice the carelessness of the average practitioner in taking impressions of cases of irregularities of the teeth, and frequently get models for advice as to treatment, and out of the many cases sent me I do not get one in a dozen from which I can make an accurate diagnosis. Often a mere wax bite or a carelessly taken compound impression provides a model—generally of one jaw only—which is utterly valueless for anything more than a guess opinion. We can't get these models too perfect to secure the best results. Every tooth, and even the rugæ on the palatal surface, as well as the eminences and depressions of the process, should be sharply and definitely outlined, and the cusps in perfect condition are absolutely necessary, if we are to eliminate guesswork and secure scientific results in treatment. The models should *always* be taken in plaster and made as carefully as though they were to adorn the niches of the famous art galleries. If we were to spend as much care and time in obtaining models for prosthodontia as specialists do for orthodontia we would have better success in fitting artificial dentures.

Dr. M. T. Watson: I let my impression dry for at least three hours before attempting to put it together, as the cement will not adhere to the wet plaster. It requires a lot of skill and tact to secure good models from some of the cases which present themselves, and we often have to modify methods to secure suitable models. A good set of models is the first step in attempting to treat any case of malocclusion. The models should be in pairs, even though the malocclusion be confined to a single tooth in one jaw. Perfect models are not necessary for constructing appliances, as we don't make appliances now; we buy them for the same reason that dentists buy burs rather than to undertake their manufacture. Unsightly malocclusions bring us most of our patients probably. It is, however, true that pathological conditions of the gums send us many, and in these conditions it is practically essential that the best models obtainable should be secured. We cannot study a case thoroughly from the mouth only. Models give us cues to the causes as well as

methods of treatment, and we cannot err seriously if we have a good model to study at leisure.

Dr. Abell: In separating the impression from the model the character of the teeth should be remembered, and the impression carved into suitable sections which can be removed with the point of a good penknife. If defects occur paint the models with thinly mixed plaster, let it harden, and then carve to the right form and occlusion. An entire tooth may be built up in this way. French chalk gives a smooth surface to models, but many do not use it.

VINCENT'S ANGINA AND STOMATITIS.

BY G. C. CRANDALL, B. S., M. D., ST. LOUIS. READ BEFORE THE SECTION ON STOMATOLOGY, AMERICAN MEDICAL ASSOCIATION, JUNE, 1904.

This infection of the throat and mouth, as described by those who have reported cases, is characterized by a membranous, ulcerative process, quite painful, but with slight systemic reaction—the lesions, especially of the mouth, usually healing slowly; the secretion, pseudomembrane, and tissue beneath containing a fusiform bacillus associated as a rule with spirillum.

As comparatively few cases of Vincent's angina have been reported in this country the following will be of interest: *History.*—Patient, male, single, twenty-three years old, medical student, family history good, always having been well except for an attack of measles and of typhoid fever some years ago. No venereal disease. He had never suffered from sore throat or sore mouth of any kind, and his teeth were unusually good. The first indication of the disease which he observed appeared one morning at breakfast, when he noticed that swallowing hot coffee caused some pain in the region of the left tonsil. Looking at his throat he found it somewhat congested on the left side. During the following day it became gradually worse, so that the mere act of deglutition was very painful, much more, however, when swallowing anything hot; the tonsil, soft palate, and uvula becoming more congested. The second day a small diphtheritic spot was observed on the upper anterior border of the left tonsil, and the pain increased somewhat. The spot was about one-fourth inch in diameter, and did not enlarge much during the six days it was present. It was covered by a grayish-white,

friable pseudo-membrane, which could be easily removed, leaving a slightly depressed bleeding surface, over which membrane would again form in a few hours.

The fourth day of the disease he had a dentist clean his teeth, and the following day the disease appeared along the margin of the gums and between the teeth, the gums rapidly receding from the teeth, and the infection extended in places over the gums to the buccal surface, especially about the last molar teeth. Wherever the infection extended it had the appearance of the primary spot on the tonsil—ulceration, accumulation of pseudo-membrane, congestion of surrounding mucous membrane, bleeding of the ulcerative surface when disturbed, and pain. The bleeding of the gums was very annoying, and with the pain prevented him from eating anything which was necessary to masticate. With the extension of the infection to the gums the breath became very foul, due to decomposing blood and membrane about and between the teeth. This unpleasant symptom continued to some extent until the disease entirely disappeared. During the early part of the attack there was a slight increase in salivary secretion, but of no consequence. There was some swelling of the lymphatic glands near the angle of the jaw on the side where the infection first appeared; later there was slight swelling and tenderness of the lymphatics of the submaxillary region after the gums were invaded. Throughout the course of the attack there were only slight constitutional symptoms; temperature was raised one-half to one degree during the first few days, after which it was normal. The patient became somewhat debilitated because of his inability to take the usual amount of food, but continued attending his college work without missing a day. He drank liquids, and ate only bland soft food, neither hot nor cold.

Treatment.—On the third day the patient began treatment, applying a ten per cent silver solution without apparent effect. On the fourth day the spot of the tonsil was touched with pure carbolic acid, followed by a gargle which consisted of 1 to 1,000 bichlorid in two per cent carbolic solution. This relieved the throat at once, but had little effect on the infection of the gums, which later were relieved by chlorate of potash in solution, and better in the form of tablets, which the patient dissolved in the mouth frequently, expectorating the saliva. The tablets were used to the end of the attack. The throat symptoms cleared up in a week, but the lesions about the

gums resisted treatment much longer, showing a tendency to recur, apparently because of the infection between and about the teeth which was so inaccessible to the local remedies used. While the throat was well in a week, the gums showed traces of the disease for six weeks.

Bacteriology.—A smear was made from the tonsil on the fourth day, first drying the spot with cotton to remove the mucus from the surface. This showed the bacillus of Vincent and a spirillum, the latter appearing identical with the *Spirocheta dentium* (Cohn), which is common in the mouth. Both organisms were abundant, with very few other germs present. Smears taken from the margins of the gums showed both organisms, but with numerous other organisms from the decomposing material about the teeth. The organisms stained readily with carbolic fuchsin, also with gentian violet, and with Loeffler's methylene blue. The bacillus took the stains as a rule much better than the spirillum, although the latter took the gentian violet fairly well. Efforts to make cultures of the organisms on the common media, gelatin agar and blood serum, were all negative. The bacilli were distinctly fusiform, averaging large, but varying in length from eight to twelve microns, and in thickness from one-half to one micron. The spirilli were thirty-six to forty microns long, and of quite uniform thickness, about one-third micron. The organisms were found abundant during the first few days of the disease; later only a few could be found.

In this case the disease was at first confined to the throat, but was quickly and thoroughly inoculated into the gums by the irritation incident to cleaning the teeth. The dentist was not aware of the infectious process in the throat; however, this case illustrates the necessity of caution on the part of the dentist in so simple a procedure as cleaning the teeth when any acute infectious process exists about the throat or mouth; then at most only the teeth and not the gums should be disturbed, and every precaution should be taken to avoid irritation of the mucous membrane, since the slightest abrasion is inoculated with the infected secretion.

When we have an acute infectious process of the throat or mouth which has a tendency to spread, it would be well to confine the diet of the patient to bland liquids and soft food requiring no mastication, thus avoiding as far as possible all irritation of the mucous membrane.

So far as known no other cases developed, although the patient was associating with other students constantly, avoiding, however, using any common drinking-cup.

Briefly reviewing the literature, we find that in 1896 Vincent reported a form of ulcerative angina due to these organisms. In 1897 Bernheim reported a series of thirty cases which conform in general to this disease, although he did not feel certain that the fusiform bacilli and spirilli found were the cause. Vincent again in 1898 reported fourteen cases. In 1901 Nicolet and Morotte described the morphology of the organism. Mayer in 1902 reported a typical case, with clinical data. In 1903 Fisher reported two typical cases, with descriptions of organisms and illustrations. Hess in 1903 reported two forms of the disease—the croupous form, due to the fusiform bacilli, and the diphtheritic form, in which both the bacilli and the spirilli were present. In 1903 Achi called attention to the possibility of considerable tissue destruction incident to the disease. In 1903 Tarruella discussed the clinical and bacteriologic features of what he terms the ulcerative-necrotic angina of Vincent. In 1903 Conrad reviewed the literature to date quite thoroughly and gave some clinical reports.

Most of the observers emphasize the tendency of the disease to run a protracted course, especially when the gums are affected. The differential diagnosis will come as a rule within three diseases —syphilis, dipththeria, and Vincent's angina—which can usually be readily cleared up by the history of the attack and a microscopic examination of the secretion from the ulcerated surface.

Discussion.—*Dr. Vida A. Latham,* Chicago: I had the good fortune to see this specimen, which I understand is only the third ever reported in America. From a dental or a stomatologic point of view it is of value, showing that dentists must recognize this disease. I had one case some time ago, but it was never recorded, as I was not sure at the time what it was. The patient's lips became almost black from the disease, and in consequence it was called gangrenous stomatitis. There was considerable pain and great nervous prostration. The only way of identifying the disease is by the microscopic examination. I would suggest in these cases the use of orthoform tablets for pain on deglutition.

Dr. E. C. Briggs, Boston: I think I had a similar case, but no microscopic examination was made. When I first saw the case I

thought it must be syphilis. There was excessive ulceration of the mucous membrane with severe pain. The patient was a man of character and courage, and I did not feel that he was exaggerating when he told me how intolerable his days and nights were. At another time I shall have a microscopic examination made for diagnosis. The case cleared up after awhile, during which time I treated him vigorously.

MULTIPLE FRACTURE OF THE LOWER JAW COMPLICATED BY DOUBLE FRACTURE OF THE UPPER JAW

BY THOMAS L. GILMER, M. D., D. D. S., CHICAGO. READ BEFORE THE SECTION ON STOMATOLOGY, AMERICAN MEDICAL ASSOCIATION, JUNE, 1904.

The following case, with treatment, is considered of sufficient interest to present for your consideration. From St. Luke's Hospital record of May, 1902, is taken the following: *"Patient.*—G. C. was brought to accident ward about one a. m., May 12, 1902, in police ambulance, presenting the following lesions: 1. Fracture of lower jaw multiple: (a) just to the left of symphysis between two left incisors, compound in mouth; (b) on right side between bicuspid and first molar; (c) at angle of jaw right side, simple; whole lower jaw was flattened antero-posteriorly and dropped somewhat toward sternum. 2. Fracture of upper jaw: (a) palate and alveolar processes broken from attachments and freely movable; (b) both alveolar processes broken loose from palate; (c) hard palate seemed fractured—antero-posteriorly throughout nearly the whole length—near the middle line. (Later examination did not positively confirm this.) 3. Loss of teeth. Upper jaw: (a) four incisors; (b) both cuspids. Lower jaw: (a) left central incisor. 4. Anterior portion of upper alveolar process detached from bone above and space so formed communicated freely with right nostril and probably with right antrum of Highmore. 5. Extensive laceration of lower lip. 6. Incised wound of chin. 7. Hemorrhage from right ear not manifested until twelve hours after accident. 8. Hemorrhage into soft parts about both eyes and into conjunctivæ. 9. Hemorrhage subcutaneous about both ears.

"Cause of Injury and Emergency Treatment.—Fall from second

story window on a stone pavement. History of intoxication obtained from room-mate and confirmed by breath. Was in a heavy stupor, not unconscious, rather restless, and was continually spitting blood. Lower lip and wound of chin sutured with silk-worm gut, about three sutures in each, in accident ward. Hemorrhage from nose and mouth was free and showed no tendency to stop. Both nostrils packed with iodoform gauze about three a. m. Hemorrhage only partly checked, and about five a. m. space leading up to nose, above the fractured alveolar process, was tightly packed with iodoform gauze. Hemorrhage then ceased after sufficient loss of blood to be appreciated constitutionally. Patient became more wideawake toward morning and remained conscious and rational. Was seen by Dr. Gilmer about two p. m., who wired, provisionally, the two teeth at sides of fracture near symphysis. Wet cold compresses were applied over face, and mouth and nose were thoroughly irrigated t. i. d. with saturated boric solution, two ounces, oil cassia, one drop. Ear cleaned, filled with boric powder, and drained.—Rectal temperature, 100.4; pulse, 86; respiration, 20."

Examination.—After a careful examination of the patient I found that the nature of the fracture and injuries of the jaws were more extensive than the history of the internes indicated. I found the man in a semicomatose condition, blood oozing from the right ear, and also a conjunctival ecchymosis. His condition was so serious that I concluded absolute quiet more important for a few days than the setting of the bones of the jaws and face; indeed, I was quite positive that he could not recover. All of the injured parts were maintained in as nearly an aseptic condition as possible, the bowels kept open, and he was kept quiet. On the fifth day he had improved to such an extent that I felt that it was safe to proceed with the treatment of the fractures. A corrected diagnosis showed that there were five fractures of the lower jaw. On the left side, one at the angle, another on the line of the first bicuspid. On the right side there was a break at the neck of the condyle, one at the angle, and one at the cuspid tooth. The upper jaw was broken in half, through the median line, and the two halves were broken from their attachment above. All of the incisors and both cuspids on the upper jaw were knocked out and lost; the other teeth on this jaw were in place. On the lower jaw, strangely, only one tooth, an incisor, was missing. Those on a line with a fracture in the body of the bone were loosened.

Treatment.—In such a case no one method of treatment is applicable, so I decided on a combination of wiring and splinting, hoping by this means to at least partially restore the contour of the face and get a reasonably good occlusion of the teeth. Looking to this end, assisted by Dr. Arthur D. Black, an impression was made of the upper jaw and teeth in very soft modeling composition, the two lateral halves of the jaw having been temporarily restored to their normal position. On a cast from this impression a modified Kingsley splint was formed of vulcanite, square brass tubes being vulcanized in the splint on each side to receive the side arms. On the lower part of this splint wire staples were secured to receive the wires which were to be attached to the lower teeth. Holes were now drilled through the bone on either side of the anterior fracture on the lower jaw, and the fragments caused by this break securely wired to each other by heavy silver wire. This gave stability to a considerable portion of the body of the bone. German silver wires were now placed around the necks of the firmly-set teeth on the lower jaw and secured by twisting. The splint was adjusted to the upper teeth and the two halves of the upper jaw were drawn forward and pressed upward in their normal relation with the bones above it, and secured in place by laces extending from the side arms, to which they were attached to eyelets in a skull cap. The wires on the lower teeth were now secured on the staples on the lower part of the splint, the lower jaw being drawn forward by this attachment to its normal position and the teeth held in apposition with the splint, the lower surface of which was shaped to correspond with what I believed to represent the normal occlusion.

Results.—The result was far more satisfactory than could reasonably have been anticipated, and was fairly well shown in a photograph taken immediately after the removal of the appliances. The occlusion of the teeth was so nearly correct that a trifling grinding made it approximately perfect. To prevent the laces slipping on the metal arms extending out from the mouth, pieces of adhesive plaster were attached to them. Through these holes were punched to receive the laces. The progress of the case was uneventful, the temperature never rising above 100.6. Primary union was secured in each fracture, and the patient was discharged one month and three days after the application of the splint and the wiring of the bone and teeth.

Digests.

INHIBITION OF DENTAL CARIES. By George Edwin Hunt, M. D., D. D. S., Indianapolis. Read before the New York State Dental Society, May 13, 1904. Attention has been frequently called of late to a lack of systematic measures directed toward the prevention of dental caries. Recent contributions to dental literature indicate that sporadic efforts are being made to remedy the defect, but as yet no one has formulated a system that to my mind presents features capable of application to all the great mass of people desirous of preserving their teeth intact. Nor have I any hope of presenting in this paper a system or mode of treatment that will answer all demands, but rather desire to call your attention to certain work now being done along this line and to add my mite in the form of a thought or two. In this paper I will not consider restorative operative procedures as an inhibitory measure, but will refer solely to such practices as may be expected to prevent the initial occurrence of the disease. Four methods of inhibiting initial carious lesions have been suggested, which for purposes of designation I will term—(1) Food Selection, (2) Mechanical Cleansing, (3) Chemical Hardening, and (4) Use of Mouth-washes.

(1) *Food Selection.*—The field for abstract speculation here is as unlimited as the practicability of the method is limited, but let us glance at it in passing. Every meal leaves in the oral cavity carbohydrates and proteids, the two groups of substances most necessary for the nourishment of oral bacteria, packed down in fissures, crowded into interproximal spaces, and clinging to the tooth-crowns wherever slight immunity from the movements of the tongue, cheeks, and lips obtains. In many mouths the absolute removal of this débris by the patient is either a practical impossibility, or if the possibility exists the determination is lacking. Hence in the great majority of mouths the characteristic fermentation changes occur after each meal.

The fermentation of carbohydrates is accompanied by the production of certain acids, of which lactic is the chief. The decomposition of albuminoids results in an alkaline reaction. When the two are mixed, Miller tells us, they produce as a rule an acid reaction,

depending to a degree on the particular form of bacteria acting on the mass, and partly on the nature of the food and the preponderance of carbohydrates in it. Lactic acid formed during the fermentative action of certain forms of oral bacteria on the carbohydrates in the mouth is the active agent in the dissolution of the inorganic constituents of the teeth. Since this is true, it is reasonable to expect that a diet from which carbohydrates have been excluded will result in practical immunity from lactic acid fermentation. To follow out a system of food selection would result in the elimination from our bills of fare of many cherished luxuries and not a few substances viewed as necessities.

All cereals are rich in carbohydrates. Wheat, rye, barley, rice, corn, and oats all contain starch readily convertible into glucose and that into lactic acid during fermentation. Battle Creek and its breakfast foods would have to go out of business. Cake, pastry, bread, sago, noodles, macaroni, spaghetti, biscuits, waffles, griddle cakes, puddings, and chicken gravy would be on the unfair list. Potatoes, beets, cabbage, turnips, radishes, fruits, preserves, jams, marmalade, jellies, and sugar would be interdicted. Even milk with its small proportion of sugar would be a suspect. Diet would be restricted to the simple proteids or albuminoids, and the hungry diner would have a choice of beef, veal, mutton, lamb, and pork. Or in the event that these did not satisfy the need for food, chicken, turkey, game of all sorts, fish, lobsters, crabs, clams, oysters, mussels, and eels might form the *menu* for his meal. Or since the percentage of sugar in milk is so small, he might risk a glass of sweet milk or buttermilk, or eat cheese or Welsh rarebit in lieu of pie. Eggs, peas, string beans, lettuce, and greens are also harmless.

A casual reading of these lists will convince anyone of the impracticability of inhibiting dental caries by food selection, and with one further thought, alien to the subject, I will pass this division. May not the excessively nitrogenous diet usually affected by rheumatics account for the lack of caries so frequently met with in those cases of pyorrhea alveolaris accompanied by the uric acid diathesis?

In treating of food selection as a possible method of inhibiting caries I have ignored the more recent theory that carbohydrates in the oral secretions are more closely concerned with periods of extreme susceptibility to caries than food debris. I am not aware that definite results have been obtained in this line of work. Even if they

have, will not an excess of carbohydrates in the food result in an increased percentage in the oral secretions?

(2) *Mechanical Cleansing.*—The beneficial effect of thoroughly cleansing the teeth has been persistently and ably presented to the profession by Dr. D. D. Smith of Philadelphia, who ascribes the inhibitory effects of his method to a "change of environment." Dr. Smith's method, as described by him, consists of the thorough removal of all deposits and the polishing of all exposed surfaces with pumice and orangewood sticks, manipulated by hand, at intervals averaging one month. It has not been my pleasure to see Dr. Smith operate, nor have I had the opportunity to inspect any of the mouths in which his prophylactic treatment has been employed. My information has been obtained from his papers and from those who have had the opportunity denied by circumstances to me. The mouths of those under his care are striking examples of cleanliness, the gums are firm and healthy, the teeth beautiful in their freedom from sordes, and caries is apparently inhibited. In a paper read in the summer of 1900 Dr. Smith spoke disparagingly of the germicidal value of the mouth-washes on the market, leaving the inference in the minds of his readers that but little reliance was placed on the use of drugs for supplementing his mechanical cleansing.

Let me, at the risk of exposing crass ignorance, give you my impressions of this method, impressions derived from the sources of information above set forth. Mechanical cleansing of the exposed portions of the teeth is instrumental in inhibiting caries in direct proportion to its thoroughness and to its frequency. It is evident from the testimony of many that Dr. Smith performs this operation more thoroughly than most practitioners, if not more thoroughly than all others. Hours are spent in carefully removing deposits and in smoothing and polishing the enamel. Were this done but once a year its beneficial effects would be much lessened. Twelve such cleansings each year are twelve times more valuable than one. It seems sweet reasonableness to admit that a tooth kept clean, as near surgically clean as the conditions will permit, will be less likely to decay than one not so cared for. So this portion of the subject would seem to resolve itself into consideration of the necessities of each mouth. Able men are now at work on the question of immunity. The periodicity of immunity is now generally conceded. During an immune period in any mouth I imagine a monthly treat-

ment such as Dr. Smith gives would be ample, supplemented as it must be by careful attention by the patient *ad interim,* to inhibit caries, but the known rapidity with which enamel becomes etched by caries-producing agencies in some mouths would point to the use of a good wash to supplement the efforts of the patient in my practice.

In Dr. Smith's practice, I presume, fissures are cut out and filled. No manipulation of which I have knowledge can prevent the invasion of caries in fissures due to faulty development. His assertion of increased pulpal activity, accompanied by increased translucency of the tooth-crown, the disappearance of marks indicating embryonic faults, and a hardening of the enamel, must receive the consideration due a careful observer; but if the future confirms his observations of enamel changes our histology of that tissue needs revision. That impacts on the tooth-crown will stimulate circulation in, first, the pericementum, and second, in the pulp, and induce increased nutritive changes in both, is proved by the results of persistent thorough mastication of resistant foods, and while I can realize that a stimulation of the odontoblastic layer the result of a better circulation, due to either Dr. Smith's massage or to chewing resistant foods, may increase the physiological tone of the dentin, the absence of ameloblasts and the histologic structure of enamel make it difficult to account for atomic or molecular changes in it other than those due to degenerative influences.

The great limitation to the universal success of Dr. Smith's method lies in the non-receptiveness of the mass of people to methods involving as much attention to detail as must be required of those patients following his system. Every practitioner can select certain of his *clientèle* over whom his professional control is such that the method under consideration could be faithfully followed out to its conclusion, but in the practice of the average operator no wholesale adherence to the strict lines of the system need be expected. The mass of our profession cannot select their *clientèle* nor influence them to submit to the rigid requirements necessary to inhibit caries by this method alone.

(3) *Chemical Hardening.*—From Basle, Switzerland, in the voice of L. C. Bryan, comes another message to those of the profession desirous of inhibiting dental caries. Dr. Bryan's views were set forth in a paper [DENTAL DIGEST, March, 1904, p. 323] read before the American Dental Society of Europe at Madrid, in 1903,

and consisting of a presentation of results obtained by bathing teeth in a forty per cent solution of silver nitrate at intervals varying from six months to one year. Dr. Bryan's method consists of isolating single teeth with the rubber dam and making repeated applications of the solution, allowing each application to dry before making another. The medicament is forced and worked into sulci and fissures and carefully applied to approximal as well as other surfaces. He states that no discoloration follows its application to sound enamel other than can readily be removed with pumice. Exposed dentin due to leaky fillings, developmental imperfections, caries, or other causes, will of course experience the well-known reactions. The inhibitory effect of silver nitrate on exposed dentin has been so frequently exploited as to be familiar to all, and I presume it is unnecessary for me to enlarge on it here, but Dr. Bryan makes certain claims for its action on tooth-structure, based on his clinical experience, that are certainly important if true. He believes he has observed a stimulation of the odontoblastic layer resulting in nutritive changes in the dentin, leading to a better physiological tone. He does not definitely claim to produce enamel changes, as does Dr. Smith, but implies a hardening even of that structure. He does profess to believe that three treatments a year from the time of eruption of the teeth will inhibit caries absolutely—this without any reference in his paper to the mechanical cleansing advocated by Dr. Smith. It is, however, only fair to suppose that the importance of cleanliness is fully appreciated by Dr. Bryan.

Let us analyze this method and the claims of its advocate. So far as atomic or molecular changes in enamel formation are concerned, clinical experience must be supplemented with other proof if the profession is to accept them as occurring. That bathing the enamel in silver nitrate will produce a change of environment by coating the surface with silver salts is certainly true. The persistence of this coating is not stated by the essayist, but during its continuance it undoubtedly will inhibit the growth of microorganisms to a degree. On unbroken enamel I believe any such deposit would be removed in the first vigorous cleansing the teeth receive, and I should rather pin my faith to Dr. Smith's method of approximate cleanliness than to a coating of silver salts. The value of the silver nitrate treatment, it occurs to me, lies in the admirable manner in which it supplements mechanical cleansing in its action on dentin exposed in developmental

defects or elsewhere, and inaccessible to manual methods. The action of silver nitrate applied in the manner described by the essayist is so superficial on dentin that, while slight transient pulp-stimulation may occur, it is doubtful to my mind whether any considerable odontoblastic activity is induced. I would rather ascribe the resultant inhibition to the purely local changes produced at the point of application, but in this I may be in error. Some years ago Dr. L. P. Bethel permeated the entire dentin of pulpless teeth with silver nitrate influenced by the cataphoric current, but its penetrative power by osmosis is very limited, owing to the impenetrable character of the coagulum produced by it when brought into contact with organic matter.

The new point presented by Dr. Bryan is the bathing at regular intervals of the entire tooth-crown with silver nitrate. The method presents undoubted points of advantage, and further advices from his clinical experience will be awaited with much interest. In connection with the best methods of cleansing that may be induced, and a suitable mouth-wash, it should prove a valuable aid in inhibiting dental caries.

(4) *Use of Mouth-washes.*—In order to make my argument on this division of my subject it is necessary to again refer to the exceptional mouths in which the environment induces excessive predisposition to decay. The rapidity with which oral bacteria proliferate is remarkable. The production of fermentative changes resulting in the formation of lactic acid is not a question of days or weeks, but of minutes and hours. Ideal dentures, largely self-cleansing, are rare. Atypical dentures with badly-guarded interproximal spaces and localities favoring the retention of food débris are, paradoxical as it sounds, the rule.

The majority of people do not thoroughly cleanse their teeth once in twenty-four hours, even in those cases where careful attention to detail in the use of thread and brush would produce nearly complete cleanliness. In many other mouths the utmost efforts of the patient will not produce approximate cleanliness. Intelligent use of the thread and brush will probably remove all solid particles of food from all smooth surfaces, but viscid mucoid secretions due to constitutional disorders may be present in any mouth and present obstacles to the absolute removal of all bacterial food too great to be overcome by ordinary cleansing operations.

It is probably not an unwarranted assertion to state that there are periods in the history of all mouths when immunity from caries-producing influences is well-nigh impossible if mechanical cleansing by the patient alone be the reliance. This is perhaps less true in the selected *clientèle* of Dr. Smith, who has demonstrated to us what may be accomplished by the cooperation of dentist and patient, but the greatest good to the greatest number demands that an effort be made to inhibit caries in the mouths of those who from negligence or thoughtlessness do not adhere to the strict letter of the law regarding mechanical prophylactic measures. A month in particularly susceptible mouths is ample time in which to produce definite degenerative effects on approximal surfaces if thread and brush are alone relied on for immunity. It is therefore my contention that in all mouths, but more especially so in those whose environment, temporary or otherwise, predisposes to carious action, a properly-compounded and used mouth-wash will be found an invaluable aid in counteracting bacterial action. With this thought in mind I have, with the valuable assistance and cooperation of Chas. R. Jackson, D.D.S., Phar.G., of the Indiana Dental College, conducted a series of experiments covering several months of time in an effort to ascertain the relative germicidal value of various drugs in strengths permitting their use in the oral cavity.

The technique of these tests, some three hundred in number, was briefly as follows: The teeth and gums were cleansed with the thread and brush after the noon-day lunch, fully as carefully or perhaps with more care than the average good patient would bestow upon this operation. Approximately three hours thereafter the mouth was thoroughly rinsed for one minute with 15 cc., about half an ounce, of the solution selected for that test. A five-minute interval was then allowed in order that the saliva might again bathe the teeth and gums. The mouth was then rinsed with 15 cc. of sterilized distilled water and a culture made in nutrient gelatin or agar from 1-6 cc. of the spittle; this we will call culture A of that experiment. An hour later the mouth was again rinsed with 15 cc. of sterilized distilled water and another culture made from 1-6 cc. of the spittle; this we will call culture B of that experiment. The culture dishes were kept until the media liquefied from colony development, or until, without liquefaction, repeated observations detected no further development. A careful record was of course kept of each experiment.

The solutions used were of the following strengths: Salicylic acid, 1:200; formalin, 1:200; Thiersch's solution, full strength; benzoic acid, 1:200, mercuric chlorid 1:2500 and salicylic acid 1:300; mercuric chlorid 1:3000 and salicylic acid 1:400; mercuric chlorid 1:3000; mercuric chlorid 1:2500.

A number of experiments were also made with various proprietary mouth-washes, merely for the gratification of curiosity. None of those tried developed valuable inhibitory action.

No special interest would attach to a recital of the results in each case, nor have individual cases any great scientific value. The technique employed was selected as adapted to give results of direct value when a number of experiments with the same solution were considered together. If similar experiments have been conducted, I am not aware of them. The method had the advantage of giving a good idea of the condition of the saliva shortly after using the solution, and it indicated the persistent inhibitory action of the solution by the results obtained in the second experiments. Anyone conducting similar tests will note great variations in the numbers of colonies developed after the use of the same solution on different days, when the conditions each day are as nearly the same as it is possible to make them. These variations are accounted for, I presume, by differences in the oral secretions and by diversities in the form of bacteria predominating in the mouth on the day the test is made. Once during the experimental work Dr. Jackson experienced a mild attack of tonsilitis, and the tests made by him during that time showed a large increase in colonies over those made with the same solution at other times. Often apparently incomprehensible results would be secured in which the first test would give tens of thousands more colonies to the spittle than the second one. In these cases I suspect a fragment of mucous membrane or a minute particle of food unmoved by the noon-day cleansing, but washed away from its mooring by the vigorous rinsing with the water, found its way into the culture media and inoculated it with many thousands of bacteria. These variations indicate the fact that only a comparison of many experiments with each solution is of value. I am well aware that the number of microorganisms in the spittle does not indicate the number present in the mouth, but it is fair to assume that a proportional relation exists between the number in the saliva and the total number present in the oral cavity.

Thiersch's solution is composed of salicylic acid 4 parts, boric acid 12 parts, water 1000 parts. In our tests it did not prove of great value. Two A cultures made by Dr. Jackson showed only 1080 and 2200 microorganisms respectively, but the other eight A cultures ran from 50,000 to 2,025,000 colonies to the 15 cc. of spittle. The B cultures varied from 13,140 to 7,200,000, most of them being in hundreds of thousands.

Thiersch's Solution.

No.			Total A.	Total B.
		GELATIN.		
42-43	Dec. 14	Hunt	93,420	189,900
44-45		Jackson	1,080	450,000
		AGAR.		
50-51	Dec. 16	Hunt	225,000	630,000
52-53		Jackson	2,025,000	3,600,000
		GELATIN.		
86-87	Jan. 7	Jackson	2,200	720,000
88-89		Jackson	1,800,000	7,200,000
152-53	Feb. 2	Hunt	17,100	45,000
154-55		Jackson	56,700	13,140
156-57	Feb. 3	Hunt	51,030	54,990
158-59		Jackson	360,000	1,080,000

Formalin 1:200 showed considerable variation from day to day. Three A cultures showed as few as 1440, 1800, and 1980 colonies respectively, but the B cultures of these experiments showed 360,000, 720,000, and 225,000, indicating but little persistency. All of the B cultures ran into hundreds of thousands, and in no B culture was there less than in the A culture of that experiment. This strength of formalin bites sharply and is fully as strong as any mouth could stand. The results from its use were distinctly disappointing.

Formalin 1:200

No.			Total A.	Total B.
		AGAR.		
54-55	Dec. 17	Hunt	900,000	360,000
56-57		Jackson	2,880,000	7,200,000
58-59	Dec. 18	Hunt	45,000	675,000
60-61		Jackson	*imperfect*	5,400,000
		GELATIN.		
70-71	Dec. 23	Hunt	1,980	225,000
72-73		Jackson	1,440	360,000
78-79	Dec. 31	Jackson	11,160	*imperfect*
80-81	Jan. 2	Jackson	1,800	720,000

Benzoic acid 1:200 gave better results than the same strength of formalin, and in three cases seemed to indicate cumulative action by

showing a smaller number of colonies in the B than in the A cultures, but the number of experiments was entirely too few to serve as a basis for a conclusion. The smallest number obtained in an A culture was 720; all other A cultures were in five figures, varying from 10,350 to 72,000. The four best B cultures ran from 1800 to 6980, but two others showed 360,000 cultures each. On the whole benzoic acid in that strength made a fair showing, and to our minds ranks above Thiersch's solution and formalin as a mouth-wash.

Benzoic Acid 1:200.

No.			Total A.	Total B.
		GELATIN.		
90-91	Jan. 12	Hunt	72,000	360,000
92-93		Jackson	11,700	360,000
		AGAR.		
94-95	Jan. 13	Hunt	720	1,800
96-97		Jackson	13,500	5,400
		GELATIN.		
130-31	Jan. 25	Hunt	18,000	6,980
132-33		Jackson	10,350	3,420
134-35	Jan. 26	Jackson	12,780	36,000

Salicylic acid 1:200 presented but little evidence of continuity of action, nor was it uniformly effective in the A cultures. Two A cultures showed as few as 900 colonies, but the B cultures following these developed 225,000 and 360,000 colonies respectively. In two completed experiments only did the B cultures show fewer colonies than the A, and a review of the record convinces me that these two cases might more safely be ascribed to errors in technique than to the efficiency of the solution.

Salicylic Acid 1:200.

No.			Total A.	Total B.
		GELATIN.		
38-40	Dec. 9	Hunt	2,250	1,800
39-41		Jackson	13,500	*no record*
46-47	Dec. 15	Hunt	1,800	85,500
48-49		Jackson	900	360,000
		AGAR.		
50-51	Dec. 16	Hunt	225,000	630,000
52-53		Jackson	2,700,000	3,600,000
		GELATIN.		
74-75	Dec. 29	Jackson	3,150	1,800,000
76-77	Dec. 30	Jackson	3,600	720,000
98-99	Jan. 14	Hunt	4,500	270
100-01		Jackson	24,300	585,000
102-03	Jan. 15	Hunt	18,000	180,000
104-05		Jackson	900	225,000
148-49	Jan. 30	Hunt	4,500	5,400
150-51		Jackson	5,580	135,000

Mercuric chlorid in aqueous solution and in various combinations gave by far the best results obtained. The 1:3000 solution did not indicate a great amount of persistency of action nor could cumulative action be safely credited to it from the few completed experiments made, but in the strength of 1:2500 some uniformly gratifying results were obtained. In ten completed experiments, the latter two being made with the addition of thymol 1:2500, four indicated augmented inhibitory action as shown by the B culture, and all but one clearly showed a persistency found in none of the preceding experiments. In one A culture absolutely no colonies developed. With one exception the variation in the A cultures was from this to 3600 cultures. The B cultures, with the exception of two showing 18,000 and one 9450 colonies, developed from 360 to 3240 colonies only.

Mercuric Chlorid 1:3000.

No.				Total A.	Total B.
			GELATIN.		
82-83	Jan. 4		Jackson	2,880	900,000
84-85	Jan. 6		Jackson	1,260	720,000
106-07	Jan. 16		Hunt	1,350	2,700
108-09			Jackson	16,200	2,700
110-11	Jan. 19		Hunt	12,600	135,000
112-13			Jackson	108,000	900,000
144-45	Jan. 29		Hunt	2,520	4,500
146-47			Jackson	16,110	540

Mercuric Chlorid 1:2500.

			GELATIN.		
62-63	Jan. 7		Hunt	1,080	9,450
64-65			Jackson	2,700	3,240
66-67	Jan. 8		Hunt	2,610	2,250
68-69			Jackson	*none*	900
136-37	Jan. 27		Hunt	1,260	1,980
138-39			Jackson	3,600	1,620
140-41	Jan. 28		Hunt	90	18,000
142-43			Jackson	270	360
225-26	Mar. 8		Hunt	24,750	18,900
227-28			Jackson	2,790	1,620

The effect of the addition of salicylic acid to mercuric chlorid was tested to some extent. A solution containing 1:3000 mercuric chlorid and 1:400 salicylic acid was used in eight experiments. The results were not especially gratifying; neither the effectiveness nor persistency of the mercuric chlorid seemed to be increased by the addition of the salicylic acid.

Mercuric Chlorid 1:3000 and Salicylic Acid 1:400.

No.			Total A.	Total B.
		GELATIN.		
118-19	Jan. 21	Hunt	1,710	7,650
120-21		Jackson	58,500	54,000
122-23	Jan. 22	Hunt	900	36,500
124-25		Jackson	3,600	18,000
126-27	Jan. 23	Hunt	4,950	5,400
128-29		Jackson	18,000	9,450
176-77	Feb. 12	Hunt	4,950	5,400
178-79		Jackson	450	*failure*

Mercuric chlorid 1:2500 and salicylic acid 1:300 showed much better results. Continuous action was indicated in six of the eight experiments, and the efficiency of the solution is undoubted. Comparison of the results obtained by each of these drugs without the other leads me to believe that the efficacy of the mixture is due to the mercuric chlorid, however, and that the salicylic acid adds nothing to its value.

Mercuric Chlorid 1:2500 and Salicylic Acid 1:300.

No.			Total A.	Total B.
		GELATIN.		
160-61	Feb. 8	Hunt	6,570	19,080
162-63		Jackson	1,080	1,080
164-65	Feb. 9	Hunt	8,100	67,500
166-67		Jackson	*none*	450
168-69	Feb. 10	Hunt	90	180
170-71		Jackson	1,070	540
172-73	Feb. 11	Hunt	4,950	2,700
174-75		Jackson	270	720

The taste of mercuric chlorid is obnoxious to many persons. In an effort to disguise the flavor and to increase its palatableness, solutions of the drug in the strength of 1:2500 were made with gaultheria water. Later varying percentages of menthol, thymol, glycerin, and oil of eucalyptus were used. These disguised the metallic taste of the mercuric chlorid without seemingly affecting its inhibitory action. The following was finally decided on as the formula best suited to our taste:

℞—Mercuric chlorid (1:2,500)	0.400	gm.
Menthol (1:3,000)	0.333	gm.
Thymol (1:10,000)	0.100	gm.
Oil eucalyptus (1:10,000)	0.100	gm.
Alcohol	30.000	gm.
Glycerin (1:50)	20.000	gm.
Gaultheria water q. s. ad	1,000.000	gm.

This may be varied at the desire of the user. In my opinion the mercuric chlorid is the only ingredient offering definite inhibitory properties, so that variation in the strengths of the remaining ingredients will neither add to nor subtract from the efficacy of the solution and may be made with the sole object of pleasing the sense of taste.

Twenty completed experiments with approximately the above formula offer fairly uniform and very gratifying results. Continuous action during the hour intervening between the A and B cultures is indicated in every experiment. In thirteen of the twenty a decidedly augmented action of the solution is indicated by the B cultures, and in one other the number of colonies developing in both cultures of a completed experiment was the same. It is therefore fair to claim that seventy per cent of the experiments made indicated cumulative action of the solution.

After 228, to 268, all tests are with mercuric chlorid 1:2500 with various ingredients, of which menthol, thymol, glycerin, eucalyptus, and gaultheria water formed a part.

Mercuric Chlorid 1:2500 with various ingredients.

No.			Total A.	Total B.
		GELATIN.		
229-30	Mar. 10	Hunt	7,830	2,160
231-32		Jackson	5,220	4,950
233-34	Mar. 11	Hunt	810	1,620
235-36		Jackson	1,800	540
237-38	Mar. 12	Hunt	450	270
239-40		Jackson	810	180
241-42	Mar. 15	Hunt	990	11,700
243-44		Jackson	540	630
245-46	Mar. 16	Hunt	1,800	2,070
247-48		Jackson	4,050	900
249-50	Mar. 17	Hunt	900	1,620
251-52		Jackson	2,430	900
253-54	Mar. 21	Hunt	7,470	1,440
255-56		Jackson	5,580	1,710
257-58	Mar. 23	Hunt	2,520	2,520
259-60		Jackson	1,080	13,050
261-62	Mar. 25	Hunt	3,600	1,260
263-64		Jackson	6,750	1,260
265-66	Mar. 31	Hunt	720	630
267-68		Jackson	1,440	360

As stated earlier in this paper, experiments conducted on the lines laid down are valuable only in the mass. Variations of oral conditions may influence individual experiments and render conclusions

drawn from them utterly erroneous. The law of averages alone will make them of value. Whether enough completed experiments were made with each solution to formulate definite conclusions is a question. I can say only that we approached the work without formed opinions, and are satisfied that the results obtained indicate the truth.

The General Result.—The inevitable conclusion to be drawn from these experiments places mercuric chlorid in a class by itself as an agent for inhibiting the growth of oral microorganisms. No other wash clearly indicated even a uniform continuous action, and certainly no other can be credited with increased efficacy an hour after using. I regret that the limit of time and the exacting nature of laboratory work did not permit us to make further tests for continuous and augmented action. The fact, however, that thirty per cent of cases showed a diminished action at the end of one hour leads me to believe that an interval of two hours would show an increase of colonies in practically all B cultures. This, however, should be tested.

There is a decided prejudice against the use of mercuric chlorid as a mouth-wash. In certain idiosyncratic conditions constitutional effects may be produced by very minute doses. Idiosyncrasies frequently exist in relation to strawberries, quinin, and cocain also, but strawberries are still eaten, and quinin and cocain are still used. An average amount of liquid with which to rinse the mouth is 15 cc., or about half an ounce; 15 cc. of a 1:2500 solution of mercuric chlorid contains 0.006 gm., equivalent to 0.09 grain. The maximum internal dose of mercuric chlorid where no idiosyncrasy exists is placed by different therapeutists at from 1-6 to 1-10 grain. In our work no effort was made to ascertain the amount of mercury ejected in the spittle, so that any statement I make on that score must be considered solely as an opinion. The ejected spittle was observed, and the variation in amount between it and the wash taken into the mouth was too small to measure with a graduate. Granting that an exchange of wash for saliva occurs in the mouth, I believe that one-tenth would be an excessive amount of wash to remain after the ejectment of the spittle. If one-tenth did remain it would mean that 0.0006 gm., equivalent to 0.009 grain, or less than 1-100 of a grain, of mercuric chlorid was present and perhaps subject to absorption by the mucous membrane of the alimentary tract. The possibilities of

untoward effects, unless the whole wash is swallowed, would seem too remote for serious consideration. I have used the formula given above from two to four times daily for the past eight weeks without untoward effects.

The Practical Lesson.—To conclude: In my opinion, any method looking to the inhibition of dental caries in those mouths characterized by excessive predisposition to decay should take into account the extreme rapidity with which oral microorganisms proliferate, and should embrace features calculated to reduce this acid-producing action to a minimum. The inhibitory action of mercuric chlorid is unequaled by that of any other substance capable of being used as a mouth-wash. I can therefore see no more reason for withholding it in those cases where its use is clearly indicated than I can see reason for the laryngologist dispensing with silver nitrate, zinc chlorid, trichloracetic acid, chromic acid, potassium permanganate, cocain, carbolic acid, or mercuric chlorid itself, in his treatment of local conditions, for fear they might cause untoward effect if taken into the stomach. I do not advocate the general and unrestrained use of mercuric chlorid as a wash, any more than I would advocate the constant use of homatropin to increase the beauty of the eyes, or the regular use of arsenic to clarify the complexion, but I do contend that in those cases clearly indicating the necessity for extraordinary efforts, if the loss of tooth-structure is to be minimized, the dentist is not only justified in prescribing it with due instruction, but will be remiss if he does not avail himself of its undoubted inhibitory action to check the proliferation of caries-producing microorganisms during the period intervening between the mechanical cleansing of the enamel surfaces.—*Cosmos.*

RELATION OF MEDICINE AND DENTISTRY. By Edward C. Kirk, D. D. S., Sc.D., Philadelphia. Read before the American Academy of Medicine, at Atlantic City, N. J., June 5, 1904. The claim which dentistry makes for recognition as a department of the science and art of healing is one which probably needs no argument to support it. The fact that its objective ends are the cure of disease and the restoration of normal function is a sufficient and self-evident foundation upon which to base the claim. Its peculiarities of origin and development have, however, caused dentistry to

occupy an anomalous position with respect to those other allied departments of the art of healing to which collectively is applied the comprehensive term of "medicine." In their origin both medicine and dentistry were probably coeval, for among all the ills which flesh is heir to primitive man doubtless suffered from dental diseases, and sought relief therefrom, as he did from his other infirmities, at the hands of those able to give it; it was in response to the demands for such relief that the healing art came into being.

Dental diseases treated by the earliest physicians.—The earliest records show that certain classes of dental diseases were treated by physicians. The writings of Hippocrates, Galen, Scribonius, Largus, Celsus, and their early followers contain descriptions of diseases of the teeth and directions for their treatment from a purely medico-therapeutic standpoint, showing that the treatment of dental diseases, including extraction of teeth, was a recognized part of the earliest medical practice.

Loss of the teeth or their partial destruction by caries necessitated a mode of treatment which practitioners of medicine were not prepared to supply. The kind of skill required in these restorative operations was that possessed by the artisan, and especially by the goldsmith and jeweler, hence it occurred that the making of prosthetic fixtures for the restoration of lost dental organs became engrafted from the calling of the artisan or mechanic. Recent studies by Dr. Vincenzo Guerini of Naples, who has given much time to the subject of dental archæology, have brought to light the fact that prosthetic dentistry was practiced by Etruscan specialists in the art, who introduced it into Rome five or six centuries before the Christian era and about four centuries before the advent of Archagathus, who according to Pliny was the first physician to practice in Rome.

It will thus be seen that dentistry has had a dual origin. Its problems in pathology have kept it in constant and vital relation with medicine, while its requirements in the restorative phase of its art have necessitated its relation with the craft of the artisan; and it is this latter feature, so essential to its practice, which has in the course of its evolution developed dentistry as a profession having a separate system of preparatory education, a special literature, and a professional organization independent of medicine.

Origin of the doctorate in dentistry.—The separate professional organization of dentistry became a necessity from the unwillingness

of medical institutions to furnish the instruction necessary for the technical education of dental practitioners. The request was made and formally refused, with the result that in 1839 the first dental college in the world for the systematic training of dentists was established in Baltimore, and the divorcement of dentistry and medicine was then officially proclaimed. The new enterprise did not escape opposition and criticism. Its graduates were authorized to call themselves doctors of dental surgery, and by many holders of the medical degree this assumption of the doctor title by the dental graduate was regarded as an invasion of medical rights, which brought down a storm of criticism on the new profession. The institution was, however, supported by the general body of dentists, its classes increased, and the coincident founding of a well-ordered periodical devoted to the interests of dentistry, together with the organization of dental societies, soon established the profession of dentistry upon a sound continuing basis.

The evolution of all that concerns the science and art of healing during the sixty-five years which have intervened since the birth of the dental profession has wrought some interesting changes in the relationships of medicine and dentistry as a result of the development which both have undergone. The most evident change which has occurred is the enormous increase that has taken place in the volume of data with which the healing art is concerned. Scientific research into the composition, structure, and function of the human body, and its reactions to those modifying influences which constitute disease, has so enlarged the scope of medicine that it is now admittedly impossible for a single human mind to successfully compass more than one of its departments; hence the development of medical specialism as an accepted mode of practically dealing with the problems of healing. It has come to be generally recognized that in order to be classed as an expert one must needs be a specialist, whereas at the period when dentistry was launched as a separate calling specialism in medicine was so little recognized as to be regarded as unethical. This growth of medical thought toward the recognition of the legitimacy of specialism has led the medical practitioner in the course of time to regard somewhat less critically the special practice of the dentist.

Relationship of the two professions.—The most potent factor which has brought about the present sympathetic relationship of medicine

and dentistry is the expansion of the curriculum of dental education so as to include the fundamental branches of medical training, and the consequent production of a class of dental practitioners whose professional ideal is harmonious with that of other practitioners of the healing art in all of its departments. There remains, however, the fact that the dentist lacks the training which leads to the medical degree, and while his training is such as entitles him to consideration and approval and due recognition for his attainments, the criticism is yet made that he is not a physician, that his training is not a medical training, that his degree is the badge of a partial culture.

In the analysis of criticism of this character the fundamental principle of all education must be given due recognition, namely, that education is ultimately utilitarian in its object. Both physician and dentist are enlisted in the service of humanity; it is for that service that they exist and it is for that service they are trained. It is true that the dentist lacks the educational training which leads to the medical degree, and therefore in a technical sense is not a physician. It is, however, not true that he lacks medical training. The professional education of the dentist to-day is based upon a curriculum which experience has shown to be best adapted to the necessities of his calling. Its foundation is constructed of all those elementary subjects which constitute the basis of the medical curriculum. In the university dental schools the instruction in the branches fundamental to the medical course is for two years, taken concurrently by the dental and medical classes, and the requirements in those subjects are identical for both, with a few minor exceptions. Upon this medical foundation is erected the superstructure of the special scientific and technical training of the prospective dental practitioner. The further pursuit of the purely medical curriculum and the attainment of the medical degree by the dental student have been found to be impracticable for two reasons:

First, because the acquirement of technical skill in dental art necessitates the development of a degree of manipulative ability which cannot easily be acquired unless its training be undertaken during the period of adolescence. Manual training must always constitute an essential part of the dental curriculum throughout its entire extent. It has been the experience of the majority of those practically concerned with dental education that where training for the development

of manual skill is deferred until early middle life, or even past the twenty-fifth year, the attainment of a high degree of dexterity is almost impossible. In the course of a discussion of this subject at a meeting of the International Dental Federation held at Cambridge, Eng., in 1901, Sir Michael Foster, deputy vice-chancellor of Cambridge University and the distinguished professor of physiology in that institution, said that he "had for many years past urged that the education of the surgeon should not be delayed too long, because it was impossible after certain years to acquire that suppleness and dexterity of touch which were necessary for success. The mind grows old very slowly, and can be educated even late in life; the body becomes old very soon, and it is necessary to train it while it is really young."

The plan of making the dentist a medical specialist *de facto,* by first pursuing the complete medical course and taking the degree in medicine, and then adding thereto the special dental training and its degree, has been frequently tried, but the practical results have been on the whole unsatisfactory, mainly because the training in dental manipulative procedures had been postponed so long as to make a high degree of practical manual efficiency impossible. Practitioners so trained have not as a class rendered as efficient dental service as those who have received their dental training earlier in life and have acquired a broader training in medicine later.

The second reason why the dentist is not technically a medical specialist is that the curriculum of his professional education is now four years [The standard at the time this paper was written.—E. C. K.] in length, and to acquire both medical and dental degrees would involve an expenditure of time and money undesirable and unnecessary for the average practitioner.

I have dealt somewhat at length with the educational aspect of the question, for it is upon that feature that the relationships of dentistry and medicine are based. I have endeavored to make clear the reasons why dentistry, though essentially a department of the healing art, is not strictly speaking a specialty of medicine, because it has had its origin and development outside the family of recognized medical specialties. It has, however, grown from a common root, developed side by side with medicine, and is growing, as it were, into the medicine of the future.

The art of dentistry, especially in America, has had a wonderful

and active growth. Perhaps in no calling of an allied character has greater ingenuity, resourcefulness, and skill been developed than in all that pertains to the technical procedures of dental art. But the problems of pathology confront the dentist in his calling, as they do the specialist who is concerned with any other part of the human body. The dentist is therefore a healer. The therapy of dental and oral disorders requires something more than prosthetic treatment. Indeed, the possibilities of dental mechanical art seem to have reached the stage where they are adequate to meet all conditions to which they are applicable, and it is to the vital side of the problem that dentistry has been and is now addressing itself. The issues with which the dental practitioner is called upon to deal are rarely those of life and death, as in the case of the practitioner of medicine and surgery, but his problems are those which are intimately associated with bodily health, and always with personal comfort. They involve an intimate knowledge of the principles of physiology and pathology as well as of the gross and minute anatomy of the structures of the oral cavity and those surrounding it, together with a general knowledge of the structure of the body as a whole. To the solution of the problems of etiology which oral and dental diseases present must be brought the same breadth of knowledge and intelluctual training as is required for the solution of disease problems in other parts of the body. General recognition of this requirement has developed the spirit of investigation and research among the scientific workers in this department, so that in its advancement dentistry has kept pace with the vanguard in medical research.

Oral diseases as expressions of metabolic errors.—The idea of a purely local relation for dental and oral disease is fast disappearing and giving place to a more rational understanding of the interdependence of these pathological phenomena and faulty bodily nutrition. Even so distinctly localized a disease as dental caries is in the light of recent scientific research coming to be viewed as an expression of a diathetic fault or an error in metabolism by which the buccal secretions are charged with a waste product which constitutes the most acceptable pabulum for the development of the caries-producing fungi. There is much evidence to sustain such a view, and if further research should demonstrate its validity the prophylaxis of dental caries would necessarily involve dietetic and con-

stitutional treatment arranged with a view to correcting the metabolic error.

The chemistry of faulty nutrition has received much valuable aid from the light thrown upon its problems through study of the oral fluids. Michaels of Paris has as a result of his investigations announced the proposition that the composition of the saliva varies constantly with certain recognized pathological states. The work of others tends to confirm the general accuracy of Michaels' generalization, and there is being developed a scientific ordering of the data of sialo-semeiology destined to be of the utmost importance in the diagnosis of various types of malnutrition. Indeed it may be claimed that the study of the chemistry of the saliva affords a more accurate picture of the status of nutrition than does the urine, in view of the fact that the saliva contains those crystallizable substances which are dialyzed directly from the blood through the glands into the mouth in a fluid which is not an excretory waste product as is the urine.

The investigations of dental pathologists into the bacteriology of the oral cavity have shown not only that the mouth is the prolific breeding-ground of many varieties of pathogenic bacteria which are its constant inhabitants, but the still more important fact that the mouth is the portal of entry by which the majority of disease-producing germs find entrance into the body at large. The studies which have been made in oral bacteriology for the purpose of determining the etiology of mouth lesions have led to much deeper problems than are presented by these purely local disorders. The constant presence of specific pathogenic bacteria in many locally healthy mouths has aroused inquiry into the questions of susceptibility and immunity, together with the more intricate problems of nutrition and the chemistry of abnormal metabolism, as factors of disease predisposition. To these vital questions dentistry is not only giving practical attention, but is contributing a fair quota of data toward their solution.

Diagnosis of systemic disturbances through mouth conditions.—The general proposition that the mouth and its contained organs may furnish objective evidence of constitutional disease is well recognized, but the diagnostic value of such evidence has had mainly an empirical basis. Dentistry is addressing itself to the scientific solution of these oral pathological phenomena and placing their

data more and more within the category of ascertained facts to be practically utilized in diagnosis. The trend of this type of dental research is to bring into closer relationship the practitioner of dentistry and the practitioner of medicine, and there is urgent need of this more intimate relationship in view of the more efficient service to humanity which it would insure.

Under present circumstances the dentist is not qualified to form correct judgments as to the problems which confront the practitioner of medicine and with which he is presumably qualified to deal; yet the circumstances of his contact with humanity are such as to place him in a position where his knowledge of the diagnostic importance of oral phenomena will often enable him to recognize serious bodily disease before the patient is himself aware of it, and consequently before the thought of seeking medical advice has occurred to him. Appreciation of the fact by the medical profession that the training of the dentist qualifies him to recognize and intelligently interpret the meaning of the oral diagnostic phenomena would inure to the advantage of both professions as well as to their respective patients.

Necessity of dental training for the physician.—Viewing the matter from the opposite standpoint, there is fully as urgent a need that the practitioner of medicine and of surgery should acquire a closer contact with what assistance dentistry is able to give in the solution of disease problems. Two cases have recently presented themselves at a dental clinic which illustrate this necessity. Both patients were suffering from a suppurative process which was discharging through a fistula in front of the angle of the lower jaw. The first case had been treated for some weeks in the surgical out-patient department of a hospital, a free incision along the lower border of the body of the mandible had been made, and the bone several times curetted, under the belief that the condition was an osteomyelitis with resultant necrosis. The curetment was continued until the roots of the molar were exposed by removal of its outer alveolar plate. In this condition the case was referred to the dental clinic, where it was found that the disorder was simply a dento-alveolar abscess, in which the accumulated pus had burrowed a fistulous outlet upon the face. Extraction of the tooth brought about a cure at once.

The second case was precisely similar, but was diagnosed as a tubercular abscess of one of the chain of cervical lymphatics, and was referred by a specialist in tuberculosis to a dermatologist for

treatment. The dermatologist made X-ray applications for three weeks with no improvement. The patient applied to the dental clinic for other treatment, and an oral examination revealed that a lower first molar with putrescent pulp was the exciting cause of the infection which led to the discharge of pus upon the face. The diagnosis was verified by injecting an antiseptic fluid through the pulp-chamber and root-canal of the molar under slight pressure, with the result that the fluid escaped from the external facial orifice of the fistula. This case promptly yielded to treatment without extraction.

The need for such mutual understanding of the possibilities of both medicine and dentistry as will prevent mistakes of this character seems self-evident. The periodical literature of both professions indicates that as the expansion of what may perhaps be expressed as "the sphere of influence" of each proceeds, the points of contact between them become more numerous. Indeed, there are many instances where no dividing line can be sharply drawn.

While much has been said and considerable attention has been given to the discussion of what may be designated the political or organic relations of the professions of medicine and dentistry, and while it is doubtless right and proper that some formal definition of those relations should be attempted, yet from the point of view of your essayist it seems infinitely more important that there should be a general recognition of the need for a closer relationship between medicine and dentistry based upon their possibilities for mutual helpfulness. A consideration of this possibility should convince us all of its advantages both to the science and art of healing and to humanity.—*Cosmos.*

FOOD AND HEALTH FROM A DENTAL STANDPOINT. By Walter H. Neall, D.D.S., Philadelphia. Read before the Reading, Pa., Dental Society, February, 1904. In the natural process of the world's evolution and advancement the dentist has certainly kept abreast of the times, and one of the most marked results of his professional progress has been the fact that he is now expected to be conversant with the diagnosis and treatment of the diseases of the oral cavity, irrespective of tooth trouble. It is not required that he shall treat malignant growths demanding extensive surgical operations, but that he shall be able to perform minor operations success-

fully and to prescribe the proper remedies when the mouth is diseased.

The claim has been made, and with entire justice, that the dentist should have complete charge of the mouths of his patients and not of the teeth only. If such be the case, the dentist becomes a stomatologist in fact as well as in name. If this claim is substantiated some grave considerations at once become apparent. For instance: Saliva—its various changes and destructive ability under certain conditions. Food—its relation to proper mastication and assimilation. Health—its maintenance by intelligent advice on food and its properties. Disease—as foretold by disturbances within the oral cavity. In short, the efficacy of the true stomatologist would reach far beyond tooth structure, with its crumbling and rebuilding. In the past the greatest obstacle confronting the dentist has been the lack of opportunity for using correct prophylactic treatment within the mouths of his patients. It was almost utterly impossible from the fact that individuals did not come under his professional care until much mischief had been done the dental organs by the ravages of caries, due to the use of unsuitable, unnourishing food, ignorance of cause and effect, besides the neglect of proper and systematic cleansing of the mouth and teeth.

This difficulty has now been almost wholly removed, from the simple fact that dentists are working in a wider field and parents realize that the teeth of their children require attention from the moment they appear within the infant gums. Nay, the dental treatment antedates even that, for long before the child sees the light of day the prudent, tactful dentist begins his battle to stimulate, to build up, to preserve tooth structure. But in spite of precautions, warnings, and rules, hardly a child reaches the sixth year without some knowledge of the dreaded odontalgia. There are many reasons advanced for this: the rapidity of the age, the incidental sickness of childhood, and the old standby, hereditary influences, but paramount to these is the *forgetfulness* of parent and nurse. An indulgent parent or a disinterested nurse, meaning no harm, oversteps the bounds of prescribed diet and administers sweetmeats, indigestibles, and such food that, if taken in the same proportion, would tax the assimilating powers of an athlete, let alone an infant with its delicate organism. The outcome is shortly manifest—a disordered stomach, an impaired digestion, and the resultant tooth decay.

While this distressing state of affairs is common in connection with the teeth of children born and raised in a sphere of wealth and refinement, the teeth of children in the humbler walks of life do not show anything like the decay noted in the others. A child raised almost in the streets, and under conditions in which filth seems to be a part of his daily life, will possess a set of teeth far stronger, far denser, and much more even than the child of the same age raised in the "lap of luxury." Right here a proverb may be coined: "A silver spoon for wealth, an iron spoon for health." The statement that the teeth of the children of the poor are better than those of the offspring of the wealthy holds good up to the twelfth and fourteenth years. At that period these children are generally put to work, and the after condition of their teeth depends mainly upon the care and attention they give them. But the main point is that the child of the street has an unimpaired digestive apparatus for a foundation when teeth salvation is concerned, whereas in the home of luxury the constitution of the child is often undermined as a result of its environment. The British Dental Association has recently pointed out this fact in an exhaustive report relative to the teeth of school children. The investigators found that the poor children possessed better teeth than the well-to-do ones, and that the teeth of those living in the country were less liable to decay than those of their fellows in cities.

These facts, if conclusive, prove that the farther away one gets from the extravagant mode of living adopted by those in affluent circumstances the better the teeth. This is exemplified in the condition of the deciduous teeth of children in regard to irregularities. A case of malocclusion or distortion is rarely found in the temporary teeth. Only after the child has reached the age when in the natural course of events the shedding of the temporary teeth and the eruption of the permanent ones are looked for is irregularity found, and unfortunately the ban falls upon various members of the permanent set. This is due in a measure to a change in the child's manner of living, the many varieties of food he consumes, the relaxation of the watchful eye, the retarded growth of the jaws, and the child's natural disinclination to properly masticate his food during this period.

If one were compelled to bring up his children by rule, then the physician and the dentist could certainly prevent many of the ills of mind and body. Some years ago a certain scientific gentleman

planned a novel experiment, and was proceeding to carry it into execution when an outraged community called a halt to the investigation. It was his purpose to thoroughly isolate an infant from the world and rear that child as an animal would its offspring, without teaching of any kind or the knowledge of any language, in order to prove his theory that, thus separated from human knowledge and companionship, the child would fashion or form a language of its own or else lose the power of speech altogether, making known its wants only by signs and guttural sounds. This experiment, if it had been consummated, would have proved of interest to the dental as well as the medical profession, because, thus separated from the world, living a free, careless, outdoor life, and safe from the environment of latter-day fashionable and indigestible productions of the modern kitchen, the isolated one's teeth would certainly have presented a profitable source of investigation.

Therefore the question, What would be the result if certain rules and regulations in regard to the observance of proper hygienic laws relating to life should be adopted and rigidly enforced? becomes worthy of consideration. It is impossible to study such a problem from infancy to adult life, but it is quite within one's power to consider the effect of an enforced manner of living from adult life on, as will be presently shown. The pages of medical and dental journals teem with matter in regard to dietetics, which no one follows until perchance as an invalid he endeavors to observe prescribed rules in regard to food and drink.

Now as to the result on tooth structure, if a man were compelled to work an imposed number of hours, to engage in recreation an allotted time, to sleep at certain periods, to rise almost with the advent of day, and to be nourished and regularly served with plain, wholesome food. Several sources are open for investigation upon this particular question, namely, reform schools, homes for orphans, convents, insane asylums, and prisons. There are other analogous establishments, but the stay of the inmates is of such a short duration that statistics would be of little if any service. Of the five enumerated the penal institution seems to approach the ideal, as far as compulsory obedience in regard to living by rule is practiced, and a certain penitentiary in Philadelphia, a model in its way, formed the basis of an investigation. It was found that the diet was of the plainest kind, but exceedingly nourishing; the health of the prisoners

was good; there was very little dyspepsia; some few were predisposed to consumption, the imprisonment being responsible for that. The condition of their teeth was much above the average, in fact, a corresponding number of free individuals selected at random and placed in competition would surely be put to the blush as regards teeth cleanliness and preservation. The prisoners have the attention of several dentists, who make periodical visits, and their reports show a very satisfactory state of affairs. Some teeth were sacrificed, due to the unwillingness of a few prisoners to pay for dental services. A limited number of plates were made because of the difficulty attending such operations, although repairs to plates already worn were of frequent occurrence. The excellent showing of the teeth in this institution was undoubtedly due to regular habits and the freedom from excesses.

In respect to the convents, three of which—where living by rule is almost ideal—were subjected to close inspection, it was observed that the standard of health among the sisters was of a high order, and that their teeth were in an admirable condition. This result was due to three causes: simplicity of diet, regularity in all things, and cleanliness. They make much of teeth attention. In fact, in one school for young ladies under the care of certain of these sisters it is a part of the regular order of things to line up the scholars night and morn with tooth-brush and powder in hand and go through the teeth-cleansing process under the watchful eye of a teacher.

In the other institutions mentioned much latitude is given the inmates; one in particular is devoted to the care of the insane, an infirmity which compels a forced sojourn under distressing circumstances; hence any deductions as regards teeth conditions for the purpose of argument would be misleading.

There is also another class of subjects affording a field for study, namely, the occupants of the out-of-door sanitariums for consumptives, one of which was particularly inquired into, both by letter and personal converse with patients. This sanitarium is situated in the mountains, and a rigid out-door life is exacted summer and winter. To quote: "The sanitary regulations are inviolable; immediate expulsion is the penalty." The meals are of the simplest kind, but good and wholesome, selected with the greatest care and to meet the requirements of every patient, although *raw* eggs and milk must be employed by all. Dyspepsia was found to be almost unknown.

Where it had existed in a recent arrival at the sanitarium it was speedily eliminated under the course of treatment prescribed. In regard to their dental organs, the consensus of opinion of those in a position to know was, that "consumptives who are *well nourished* otherwise have very little trouble with their teeth." The stress in every instance is laid upon being *well nourished.*

Yet this report does not really prove much, for consumptives as a general rule have exceedingly dense teeth and seem peculiarly immune to teeth decay. Why this is so is an enigma. Science is progressive, far-reaching, and continually investigating, and yet there are questions ever unanswered. Why is there an increase of weight in one instance and a loss in another? Why does one enjoy perfect health and display a shockingly bad set of teeth? Why is the rule reversed and the next individual, bound to an existence of continual ill-health, present almost perfect dental organs? Why do dispositions differ? Why do tastes change? Why? Why? Life is one great interrogation point.

As the saliva plays an important part in certain conditions of the teeth, it has been under investigation and study for a period of years by certain dentists possessing an ultra-scientific bent of mind, and although the research has been exhaustive there are many attributes of this fluid that still remain obscure. We know that its flow changes, its composition frequently deviates from the normal, and its action is vicarious, and as it constantly bathes the teeth, its various conditions, in sickness and health, have unlimited opportunities for working good or evil upon tooth substance. The slightest indisposition makes its impression upon the saliva, and straightway other conditions exist far from normal. The term "vitiated saliva" is frequently used by the dentist. The patient inquires as to the why and wherefor of decay and erosion, and the dentist's answer is that "they are due to vitiated saliva." This explanation the patient accepts as being the correct and only solution of the trouble, and yet it is a question whether the dentist himself could proceed further and really explain just what "vitiated saliva" is.

Drs. Kirk, Michaels and Miller are studying this interesting subject enthusiastically; they have examined the saliva of thousands of individuals, and yet, as Dr. Kirk observes, it is still an unknown quantity and presents a vast field for further investigation. They have found that the saliva will disclose many secrets. It will lead to

a proper diagnosis in regard to the condition of health of the person from whom it was taken, but why it does certain other things is yet shrouded in mystery. That the saliva under certain conditions causes erosion of the teeth is a well-known fact, and Dr. Kirk and others take the ground that the chemical change produced by erosion is quite different from that of caries and is just as sensitive and disagreeable. While erosion may exist *in statu quo* for a great length of time without giving annoyance, it must eventually be excavated and filled.

Dyspepsia has been referred to frequently in the course of this article; naturally this leads to a contemplation of that disease which is so peculiar to the American people. That it prevails among them to such an alarming extent is undoubtedly due to their heedless rush, restless activity, and their criminal neglect of proper consideration and respect for their digestive organs; and while its treatment seems far removed from the province of the dentist, yet dyspepsia and bad teeth, or lack of teeth, are associated, and the dentist is frequently called upon to exercise his art when dyspepsia prevails, for it has become an idiosyncrasy of the physician to make such a requisition.

The question whether decayed teeth or absence of teeth predisposes to dyspepsia, or whether dyspepsia causes caries and subsequent loss of the teeth, is a mooted one. Along this line, then, the dentist should certainly voice his opinion, because proper nutrition is the essence of life, and as nature has given to man teeth for the purpose of securing this attribute for a healthy constitution, teeth and proper nutrition are deemed inseparable companions. A man suffering from dyspepsia cannot be said to be healthy, and yet such a one need not necessarily possess a bad set of teeth.

The argument is advanced that as God has placed the grains of the earth, the beasts of the field, the fowls of the air, and the denizens of the deep at man's disposal for his sustenance, it is man's duty to avail himself of so great a privilege. True enough, but God also endowed man with a brain so that he could choose that which would be of the most benefit to him. Has man chosen aright? In a measure civilization has upset the calculation of the Great Father of wisdom, for it seems that the higher the civilization the greater are the efforts of the chefs to devise some rich, savory dish calculated to tickle man's palate as well as disorganize his stomach. In this connection

one of Ray's proverbs is particularly apt: "God sends meat and the devil sends cooks."

It seems to be the universal rule to allow the knife and fork and stew-pot to usurp the rights of the teeth. The boiling process of the one prepares the food so that it is easily handled by the others, mastication becomes a farce, and the necessity for teeth to perform such a duty is reduced to a minimum, and when such a state of affairs exists hardly one person in ten thinks of masticating a rather tough morsel—it is generally bolted with the softer particles. There are persons who rarely chew their food. They simply press it between the tongue and the roof of the mouth or else against the backs of the teeth, and after extracting the juices eject the solid portion. Frequently when a certain solid food for which they have a pronounced liking is placed before them it is treated to the mashing process and then swallowed, and as a consequence the stomach rebels and a case of dyspepsia, either in the form of a rash, nausea, or violent pains, is experienced. The soundest teeth in the world would not avail against such a procedure.

Dentists are frequently censured for a deplorable condition of their patients' teeth as well as their ill-health, when the patients themselves are to blame. These persons are of the "coddling" nature, who will not bear the slightest pain, who cannot endure the least draught, who will not tolerate prescribed remedies or conform to a suitable diet; comfort without exertion is their motto, and yet they are free to inform the dentist that their disordered stomach is due to the fact that their teeth are not kept by him strong and sound, or that something ought to be discovered that will prevent erosion, sensitiveness, and the wasting away of the gum tissue. The millennium has not yet arrived.

Many cases have come under the writer's notice of young Irish women, fresh from the Emerald Isle, whose teeth were on the first examination as Solomon in one of his songs describes the teeth of a beautiful woman: "Thy teeth are like a flock of sheep that are even shorn, which came up from the washing, whereof every one bear twins and none is barren among them." Alas! at the end of six months caries had made wonderful progress, and within the year exposed pulps, toothache and angry swollen gums from the presence of salivary calculus were the rule. It was not so much the change from one country to another that produced such a grave condition,

but rather the difference between their former simple mode of living and one of greater complexity, and the main cause was the change in food. With the carious teeth invariably came dyspeptic symptoms.

The following is a remarkable case of a mother's misplaced devotion and indulgence: In spite of admonitions, a child of four was served with coffee every morning before arising; was allowed to eat plentifully of any article upon the dining table; partook freely of raw dried beef as well as of bologna sausage; ate as many as three boiled dumplings at a meal; frequently devoured a plateful of pieces of dough contained in certain soups; candy and cake were had for the asking, and it was not long before that child was in the toils of the dyspeptic fiend, besides suffering decay and breaking down of all her teeth. Recently a childish disease fastened upon her, but her vital force was at such a low ebb that to-day a little grave marks where she sleeps. The want of teeth did not produce this dire result, but rather was it due to the need of restraint, an intelligent discrimination as to food and regulations regarding time and manner of eating.

A few years ago a gentleman presented and stated that his continual ill-health was due to the presence of a number of amalgam fillings in his teeth and that his physician had ordered their removal, said physician claiming that the mercury in the fillings was responsible for his patient's disorder. As the writer had inserted the amalgam fillings some years previous, he, resenting the imputation contained in the request, as well as recognizing the absurdity of the diagnosis, sent a rather caustic reply to the medical man, stating that mercury to produce any alarming results must be subjected to a temperature far beyond the possibility of the human mouth to endure, and that the patient was really suffering from a serious attack of nervous dyspepsia, as his condition and unbearable stomach odor plainly indicated, and advised certain remedies and treatments; advice which the physician evidently followed, for there has been no further complaint—in fact, the patient is a well man to-day and the amalgam fillings still remain.

Thus do erroneous impressions frequently creep in among the laity, and it is sometimes almost impossible to convince some patients that their teeth are *sound* when they claim that there is a response to thermal changes; that sweets produce sensations, and that soreness is experienced under mastication, and it is equally as difficult to make them understand that although you can restore a contour or supply

missing teeth, these will not relieve them from the distress of dyspepsia or other stomach trouble. It is doubtful whether a set of false teeth will restore a dyspeptic to full normal digestive power any more than a pair of spectacles will renew the sight of one who is going blind. An artificial denture assists in the eating, it is granted, but the stomach after all is the great dictator, and the most perfect set of teeth that art can produce will *not* cure dyspepsia. Not a single instance has been encountered where a person suffering from dyspepsia, while possessing natural teeth much decayed or loosened by pyorrhea, ever had a total abatement of the disease by the use of artificial ones. In other words, dyspepsia must be cured without too great a reliance upon teeth.

It has recently been argued that elderly people, after losing their own teeth, should not have recurrence to false ones, as the latter had a tendency to continue them in the eating of food not suitable for old age. The suggestion is preposterous, from the simple fact that no one can say just when the age is reached when soup and broth and gruel and such like food should be indulged in to the exclusion of all others, nor would a person be particularly pleased to be thus reminded of approaching second childhood. Yet there are times when one feels almost justified in wishing that there might be a compulsory set of rules governing the act of eating. Instance the case of those who day after day snatch a quick lunch and forget within the hour what they have eaten. Surely the food does them not a particle of good, though it does disclose the fact that such persons do not live to eat.

There is yet another phase regarding this great question of eating. It is important that one should be careful as to what goes into his stomach, and it is certainly of as great moment that one should be careful that the waste products are eliminated regularly and properly. One's health is seriously menaced when constipation exists, and one's life is much nearer the "snuffing-out" period if nature's demands are repeatedly disregarded. An eminent surgeon has frequently said that probably one-half of the cases of appendicitis would have been prevented if a gentle laxative had been used once or twice a week. On the other hand, there are those who take medicine every morning before securing a movement of the bowels. At first it is resorted to for a slight constipation; later it becomes a habit, and finally positively essential.

As a proof of what correct living as regards eating, sleeping and working will do for man, it is only necessary to study the requirements of the training table and training quarters, much in vogue with those who follow an athletic life strenuously, and observe the result. The men are in absolutely good health and remain so during the long period of preparation leading up to an important event.

A trained athlete featured at a theatre cannot lift weights the extreme limit of his power night after night; soon would come the breakdown in nervous force, energy and strength, and yet man expects his stomach to perform prodigious feats of digestion year after year; but there comes a day of reckoning, and almost without warning nature revolts and we have the confirmed dyspeptic, the man in broken health, he of morbid thoughts and distorted ideas.

Good teeth, good food and good health make life worth living. Good teeth assist in the enjoyment of good food; good teeth and good food together are the principal features in the maintenance of good health.—*Brief.*

REVIEW OF DENTAL MATERIA MEDICA. By G. B. Squires, Ph.G., D.D.S., Somerville, Mass. Read before the Boston and Tufts Dental Association. In Squibb's latest review of materia medica, pharmacy and therapeutics he says: "It may be quite confidently stated that there has been during the past year a possibly slow but very decided revulsion in the medical profession, at least in some quarters, against the efforts of a few enthusiasts to press forward the claims of some new products." This is surely encouraging. Let us hope it applies also to the dental profession. There is no doubt there have been scores of new remedies brought forward during the past four or five years which were no better, and in many cases not as efficient as the older agents which their advocates endeavored to supplant.

Acetanilid (*Phenyl-acetamid*).—Formerly known by the patented name antifebrin. Prepared by heating together anilin and glacial acetic acid. Squibb says, "It has lost none of its prominence during the past year, and has evidently settled down as one of the reliable synthetic products which have come to stay." However, we must bear in mind its toxic effects, as there are still many cases of poisoning reported. I will quote one only: "Dr. Philip King Brown of San Francisco reports 'A Fatal Case of Acetanilid Poisoning' in a

shoemaker, thirty-seven years old, who had been given by a lodge physician 60 grains in six powders for his headache, and had taken them all within a few hours before his regular attending physician was called. The man died in six days." In fatal doses it depresses the nervous system and heart. I seldom use this drug, as there are other remedies just as effectual and less toxic. As you know, it is an antipyretic, analgesic and antiseptic, and the conservative dose would be from 5 to 10 grains.

Acid Carbolic (*Phenol*) (*Phenyl hydroxid*).—A product of the distillation of coal-tar. Also prepared synthetically. Its pharmacopeia title is a misnomer. Let us hope the forthcoming revision will give it the proper name—phenol. Originally it was supposed to be an acid, but for years its true chemical formula has been known. I consider carbolic acid one of the best remedies we have for dressing putrescent pulp canals, and for treating chronic alveolar abscesses with fistula it is practically a specific. My records for the past three years show over 90 per cent of such cases cured with this agent.

Acid Trichloracetic.—Prepared by the action of chlorin on glacial acetic acid. A valuable astringent and hemostatic. Used as an astringent application in pyorrhea alveolaris in strengths varying from 25 to 95 per cent. Applied to hypertrophied gum tissue found overlying the cervical border of deep-seated cavities it accomplishes three things, namely, checks the bleeding, shrinks the tissues, and by producing a white eschar lights up the cavity to an appreciable extent. In such cases I consider it far superior to adrenalin. Of course it should be applied with judgment and not over too large an area.

Acoin.—A synthetic local anesthetic. Squibb says it is gradually disappearing from notice. It is still used, however, its advocates claiming that with the same dose the period of anesthesia is three times longer than with cocain. Dr. Bah recommends the following formula as an injection for extraction:

	Grams
Acoin	
Cocain hydrochlorate.....	
Sodium chlorid āā.....	0.5
Acid carbolic.....	0.2
Distilled water.....	100.

He has used this in 200 cases with perfectly satisfactory results.

This solution equals 5 per cent cocain solution in anesthetic power, with no bad symptoms. As much as one dram has been injected at a time. Some of its bad features are that it causes considerable pain during the injection and sometimes the anesthetic effect lasts several days.

Adrenalin Chlorid.—The active principle of the suprarenal capsule. Marketed in 1:1,000 solution. I found no mention of this agent in any of Squibb's reviews of new remedies, showing that he considers it still in the experimental stage. It is a cardiac stimulant and hemostatic. Until its action is more thoroughly known it should be given internally with care. When used as a hemostatic some claim it has a tendency to produce secondary hemorrhage. I find it beneficial for checking hemorrhage, in amputating ends of roots, extracting roots and other minor operations in the mouth. I do not find, however, that it acts as completely and instantaneously as the literature sent out by the manufacturers would lead one to suppose.

Airol (*Bismuth Oxy-iodogallate*).—Very little literature has appeared on this agent during the past year. It has been largely and successfully used by surgeons in the Russian army recently. Its advantages over iodoform are: its being non-toxic, without odor, and without irritation to the wound. It is a grayish-green powder insoluble in water; in fact, water decomposes it. For dental use it can be suspended in glycerin or some of the oils.

Alcohol (*Ethyl hydroxid*).—The best antidote we have for carbolic acid poisoning, either externally or internally. Externally it is used full strength. For washing out the stomach about 40 per cent is used. It acts by dissolving the acid, the resultant solution being less escharotic than an aqueous solution. In internal poisoning sodium sulphate should also be given to counteract, by converting it into sulphocarbolate of sodium, any taken into the circulation.

Alcohol Absolute.—Containing about 98 per cent of ethyl hydroxid. I merely mention this as a good liquid for keeping hypodermic needles clean and free from rust. They should be made aseptic, however, before placed in the liquid, as it appears by recent experiments that absolute alcohol is not as strong an antiseptic as the 60 to 70 per cent solutions.

Ammonol.—In the *American Journal of Pharmacy* is a very careful examination of this agent by Mr. G. M. Beringer of Camden,

N. J. He concludes his report by saying, "From my examination I am compelled to conclude that ammonol, instead of being a new coal-tar derivative, is merely an admixture of the well-known acetanilid, sodium bicarbonate and ammonium carbonate, and that the following formula represents its real composition:

	Grams.
Acetanilid	10.
Sodium bicarb	5.
Ammonium bicarb	5.
Metanil-yellow	0.005

"Ammonol thus appears to be another of the numerous mixtures of acetanilid that are being palmed off on the gullible physician as new and valuable discoveries."

Amyl Acetate.—I refer to this because it is one of the best solvents of celluloid we have. A little non-colored celluloid dissolved in this liquid makes a cavity lining equal to the best on the market.

Anesthesin.—The name given by Dr. Ritsert of Germany to a product he has prepared as a substitute for cocain. Chemically it is the ethyl-ester of par-amido-benzoic acid. Appears in fine needle-like crystals slightly soluble in cold water, but more readily in hot water. Claimed to be much less toxic than cocain. Dr. Dunbar of Eastern Prussia uses for subcutaneous injection the following solution:

	Grams.
Anesthesin hydrochlorate	.250
Sodium chlorid	.150
Morphin hydrochlorate	.010
Aqua distil	100.

This can be sterilized. He says the anesthesia is complete for thirty minutes. It has also been recommended for sensitive dentin.

Antipyrin (*Phenazone*).—Is still fully recognized by the medical profession. Is prepared by treating anilin hydrochlorid with sodium nitrite. Is an antipyretic, analgesic, antiseptic and hemostatic. As a hemostatic it can be used pure or in aqueous solutions. The National Dispensatory says, "Its contact with teeth discolors them." Great caution should be used in prescribing this agent with other drugs, for it is incompatible with about everything. I have seen prescriptions written for fever mixtures, containing, among other

things, this drug and sweet spirits of nitre. Had the apothecary compounded them serious results might have followed, as antipyrin with spirits of nitrous ether forms a nitro-derivative which is poisonous. Dose of antipyrin, 5 to 10 grains.

Argonin.—A silver compound formed by mixing silver nitrate with a combination of sodium and casein—containing 4 per cent of silver. Appears as a white powder soluble in hot water. As a bactericide it is considered inferior to protargol and largin, both silver compounds.

Argyrol (*Silver Vitellin*).—Could find very little trustworthy literature on this new agent. It is a dark brown powder, very soluble in water. Stains linen black. Claimed by the manufacturers to contain 30 per cent of silver and does not precipitate albumen.

Aristol (*Di-Thymol Di-Iodid*).—Made by mixing a solution of iodin and iodid of potassium with solution of thymol and sodium hydroxid. Contains 46 per cent of iodin. Heat and light decompose it. I consider this one of the best substitutes for iodoform which we have. I have always used absorbent cotton impregnated with this drug for packing wounds in the mouth, such as those produced by amputating ends of roots, gangrenous tooth sockets, etc., and always with perfectly satisfactory results. Have also used it in combination with thymol and eugenol, made into a paste with zinc oxid for filling roots, canals and pulp-chambers of deciduous teeth, and in no case where the patient allowed thorough preparation has subsequent ventilation, by drilling through the side of the tooth or otherwise, been necessary.

Bacillol.—An antiseptic whose composition is kept secret. It is claimed to contain 52 per cent of cresol, and that a 1 per cent solution destroys most organisms within 8 minutes and a 2 per cent solution in 1 minute.

Calcium Chlorid.—This is both a systemic and local hemostatic. In the proportion of 30 grains to 1 ounce of water it has been used topically with success where other styptics have failed. In persistent hemorrhage and before operating on so-called bleeders it is given internally in doses of about 10 grains 4 or 5 times a day. The *Medical Brief* cautions against giving it continuously for more than 3 days, as prolonged use decreases the coagulability of the blood.

Chinosol.—A potassium salt of a compound of oxy-chinolin and

sulphuric acid. An antiseptic and bactericide. This is still a favorite disinfectant with many surgeons. Appears as a fine yellow crystallin powder, freely soluble in water. Is especially recommended for sterilizing the hands, as it is odorless, non-poisonous, and produces no irritation of the skin. A 10 to 20 per cent solution is employed. Dr. Nottebaum of Germany finds it to be an efficient styptic also. It cannot be used to sterilize instruments, as it corrodes them unless nickel-plated. It is said to darken the teeth if used in the mouth.

Chloralose.—Made by heating equal quantities of anhydrous chloral and dry glucose. Appears in small colorless crystals, very disagreeable taste. For this reason it should be prescribed in cachets or capsules. This is one of the newer hypnotics which is still being frequently used. Dr. James Tyson of Philadelphia summarizes a report of its use in 9 cases as follows: "1. Chloralose is a prompt and safe hypnotic, more prompt in its action than any drug except morphin. 2. From a large experience with chloralose I am satisfied that it is more prompt in its action than chloral and efficient in much smaller doses than the latter drug. 3. Its effects occasionally include involuntary actions, which, while surprising and even fantastic in some of their exhibitions, are nevertheless harmless. 4. The drug needs to be further studied. 5. The maximum dose is 5 grains * * * which may have to be repeated in not less than an hour."

Chloretone (*Acetone-Chloroform*).—Formed through the interaction of chloroform, acetone and an alkali. Is a white crystalline compound sparingly soluble in water. Hypnotic and anesthetic. Reports on this agent are still conflicting. Dr. J. C. Dunn of Pittsburg says: "I believe that its use as a local anesthetic is worse than useless. As a hypnotic it cannot be relied on when a prompt effect is desired." Dr. W. R. Stone of New York reports very gratifying results when used as an ante-operative hypnotic. In spinal anesthesia he combines it with cocain and obtains much better results than with any drug he has previously used.

Citarin (*Sodium Anhydro-methylene Citrate*).—Claimed to possess the property of dissolving uric-acid secretions as well as of increasing the power of the urine to take up uric-acid and then eliminate it from the system. Suggested as a remedy in certain forms of pyorrhea. The dose is 30 grains, 3 to 4 times a day.

Cocain.—One of the nine alkaloids found in erythroxylon coca. The hydrochlorate is still extensively used, especially by the medical profession. Considering the dangerous symptoms that sometimes appear when using this drug, even when the minimum dose is employed, I think the conservative dentist will continue to use in the great majority of cases some of the reliable substitutes. Fatal cases produced by this agent are reported yearly. Dr. Leguen of Paris recently reported, "Two cases of immediate death from rachicocainization," both occurring on the operating table in a few minutes after the injection of 5-16 of a grain. As you know, cocain solutions cannot be boiled without decomposition, and to keep an aqueous solution stable for any length of time a preservative has to be used. Many preservatives are irritants when injected into the tissues. For this reason their promiscuous use should be condemned. Squibb says: "Out of all the preservatives, however, none has given better results than boric acid, and a 2½ per cent solution will accomplish the result."

Cocain Phenate (*so-called*).—A yellow mass, insoluble in water. Prof. Olefele, a French observer, prefers this to the hydrochlorate. He claims its action is more lasting and that less toxic effects are produced. He employs the following for hypodermic use:

	Grams.
Cocain phenate	0.10
Dissolved in alcohol	5.
Distilled water added	5.

Creolin (*Liquor Antisepticus*).—I quote from Squibb's last mention of this agent: "Creolin, 1 part resin soap and 2 parts crude carbolic acid 20 per cent, has not been alluded to in the current medical literature of the year, although undoubtedly it is still in use. In 'Exchange,' 1902, is the following: 'Its (creolin) germicidal powers are ten times superior to those of carbolic acid.'" I fail to see why 1 part of resin soap added to 2 parts of a 20 per cent solution of carbolic acid should make a mixture ten times more powerful as a bactericide. The writer must be in error.

Creosote.—A mixture of phenols, chiefly guaiacol and cresol, obtained during the distillation of wood-tar, preferably of that derived from beech-wood. I have heard this called an oil, but of course it is not. It is sometimes described as having an oily consistency. You are familiar with the dental uses of this agent. On account of its

penetrating odor it should not be kept permanently in the dental office. Creosote, like carbolic acid, coagulates albumen, but does not coagulate collodion while carbolic acid does. Therefore a simple test for the presence of carbolic acid is to mix equal volumes of collodion and the creosote in a dry test-tube. No coagulum should form unless carbolic acid is present.

Dionin (*Ethyl-Morphin Hydrochlorate*).—A white odorless powder having a slightly bitter taste, freely soluble in water. A synthetic analgesic. Considered by some to be a most valuable substitute for morphin. Does not have the toxic properties of the latter drug and does not lead to habit. Is claimed not to provoke nausea, headache, or constipation. Is prompt, safe and effectual and is as or more powerful in its action than codein. Dose, ½ grain. I think the dentist should seldom if ever prescribe morphin. If we require an analgesic stronger than phenacetin and like agents we have codein, this newer drug, dionin, and others, without resorting to this drug. However, if morphin is prescribed one should always write on the prescription, *Do not repeat.* I have seen the morphin habit innocently acquired through the doctor's neglect in not giving this instruction to the druggist.

Dormiol.—A combination of chloral hydrate and amylene hydrate; sometimes called amylene-chloral. A colorless liquid with a camphoraceous odor. Marketed in 50 per cent solutions. Dr. Romme in *La Press Medicine* says: "It is the ideal hypnotic. Is prompt and certain and is almost exactly similar to natural sleep. It acts in ½ to 1 hour and the sleep lasts from 5 to 8 hours." He claims it produces no dreams and no bad aftereffects, such as headache, depression, etc., and is superior to all other hypnotics except trional. Dose of the 50 per cent solution, 15 to 60 minims well diluted with water.

Electrozone.—A name given to an antiseptic solution which is supposed to contain sodium, magnesium, calcium and other hypochlorites. There has been practically no mention of this in the medical literature of the past year.

Ethyl Bromid (*Hydrobromic Ether*).—A colorless, inflammable, volatile liquid. Should be kept from light and air. This is on the increase as an anesthetic for short operations, especially with surgeons of this country. Dr. W. Krusen of Philadelphia speaks very highly of it in obstetrics and gynecology. I quote from his report

in the *Philadelphia Medical Journal:* "The advantages which may be confidently claimed for this agent are: 1. The short space of time required to render the patient unconscious. 2. The small quantity of the drug employed and the rapidity of its elimination from the system. * * 4. The comparative freedom from unpleasant sequels, such as headache, nausea, vomiting, etc. It is generally given by means of a cone made from a towel and covered with paper. Into this cone 1 or 2 drams are poured and the patient is requested to breathe deeply. This quantity can be renewed once or twice if necessary to produce complete narcosis." The greatest objection to this agent at present is its liability of being impure. Mr. J. P. Gilmour of England has examined during the past three years 50 samples obtained on the market, and reports that "30 were utterly unfit for anesthetic purposes, owing to the presence of deleterious compounds." *Caution:* Do not confound this drug with ethly*ene* bromid, which is poisonous.

Ethyl Chlorid (*Muriatic Ether*).—Is used quite extensively, especially abroad, by surgeons for minor operations about the head, and is probably used more by dentists than the bromid. Surgeon F. E. Marshal of England has used it in 46 dental cases, with two failures, which he claims is a better record than with nitrous oxid gas. Dr. A. Malherbe of Paris is quite enthusiastic in its praise. He performs rapid anesthesia by what he calls the compress method, which consists in pouring from 2 to 4 grams of the ethyl chlorid on a compress which is placed over the mouth and nose so as to completely exclude the air. He says: "Narcosis is quite complete in from 20 to 40 seconds, and lasts from 3 to 4 minutes without excitement. If a second application is made an operation of from 15 to 20 minutes can be performed with safety." Ethyl chlorid is claimed to produce less excitement than ethyl bromid, and to cause more perfect relaxation, and can be given for a longer period with less danger. At ordinary temperatures and pressure ethyl chlorid is a gas. When compressed it is a colorless liquid. It is highly inflammable, therefore should not be used near a flame. The mortality of bromid and chlorid of ethyl at present is about the same as chloroform—one death in 2,075. Of these two agents I think the preference from a dental standpoint is for the chlorid, and I believe we are justified in trying it when all conditions are favorable. It is surely greatly superior to nitrous oxid gas in two respects: 1. It

produces a much longer state of anesthesia. 2. There is no cumbersome apparatus to manipulate or to frighten the patient. Ethyl chlorid is also used as a spray for local anesthesia, but the difficulty of application, especially around the posterior teeth, limits its use in this field.

Eucain-B Hydrochlorate.—A synthetic compound used as a substitute for cocain in producing local anesthesia. Is claimed to be from 5 to 8 times less toxic. Its aqueous solution keeps well and can be boiled without decomposition. Superior to cocain in that it does not cause heart depression or other unpleasant effects. *Merck's Archives* tells us that Dr. Marcinowski has just published an exhaustive treatise on Beta-eucain. His conclusions are as follows: "Beta-eucain is perfectly non-irritating if the solution is not too strong or improperly prepared. A 0.6 to 0.8 per cent solution of sodium chlorid is the preferable solvent. By keeping within the limit of 5 per cent concentration swelling and infiltration of the injected area may be largely avoided. Is over 3 times less poisonous than cocain, and the anesthetic action is about equal to it." He advises employing it at blood temperature. I consider eucain one of the best substitutes for cocain we have. I have been using it almost exclusively for the past three years, and have never observed a disagreeable symptom. I have had patients tell me they had swelling of the tissues about the extracted area. This occasionally occurs, but with no pain. I use a 3 per cent solution and consider I get more perfect anesthesia than formerly when employing a 2 per cent cocain solution. I always boil just before using, therefore inject at practically blood temperature. I think it a good idea to use the sodium chlorid as suggested by Dr. Marcinowski.

Eucalyptol.—A neutral body obtained from the volatile oil of eucalyptus. For an antiseptic dressing this should be used in preference to the oil, as it is the stronger. In fact, the efficacy of the oil as an antiseptic depends upon the percentage of eucalyptol it contains. In the October, 1903, *Cosmos* a Dr. Wheeler says: "Eucalyptus oil contains 3 oils, the best of which is eucalyptol." This is erroneous. Eucalyptus oil does not contain 3 oils and eucalyptol is not an oil.

Eugenol (*Eugenic acid*).—An oxidized product of oil of cloves. A colorless, oily liquid, soluble in alcohol, ether and chloroform. When mixed with zinc oxid there is a slow chemical reaction, the

mass finally becoming hard. This makes a good pulp protector; the principal objection being its slowness in setting. Dr. A. H. Peck, writing in the 1899 *Cosmos,* tells us that eugenol is useless as an antiseptic. Squibb, Merck and Bartley's Medical Chemistry all class it as a strong antiseptic.

Europhen.—A yellow powder, soluble in alcohol, ether, chloroform, and fixed oils. This antiseptic, containing 27 per cent of iodin, is being constantly used. Dr. W. E. Thomas of Brooklyn, writing in *American Medicine,* says: "In this drug we have an iodin compound fully as efficacious as iodoform in surgery. . . . Owing to its low specific gravity, and its twofold antiseptic power due to the setting free of cresol and nascent iodin, it would seem that at last we have a safe and reliable antiseptic."

Formaldehyd (*Oxymethylene*).—This antiseptic, germicide and deodorizer is still being extensively used. Practically all boards of health consider formaldehyd gas the best disinfectant we have for the surface disinfection of infected dwellings. Dr. Wm. G. Bissell, writing in the *Buffalo Medical Journal,* summarizes the use of this gas as a household disinfectant as follows: "1. It is the most satisfactory of the gaseous disinfectants. 2. Its penetrating powers are extremely slight. 3. A certain degree of moisture facilitates its action. 4. It should always be supplemented by a cleansing process." I think every dentist should have a formaldehyd lamp for generating this gas, and should fumigate his office at least once a week, and with an oven attached he can use it for sterilizing instruments. Formaldehyd gas is marketed in about 40 per cent aqueous solutions. This diluted to a 2 to 5 per cent solution is being extensively used as a dressing for putrescent pulp-canals. It is especially adapted to the anterior teeth, as it produces no stain. Care should be taken, however, not to force it through the apical foramen, as even in weak solutions it is a decided irritant when brought in contact with the soft tissues. The gas is formed by the oxidation of methyl alcohol, generally by passing a current of air saturated with the alcohol over a spiral coil of platinum brought to a high heat.

Gelatin.—I copy the following from one of Merck's recent publications: "Dr. Zuppinger of Vienna uses injections of gelatin in bleeding occurring in hemophiliac children. He gives a case of bleeding following tooth extraction in a girl with severe purpura hemorrhagica. Ordinary styptics had no effect. A hypodermic in-

jection of 10 c.c. of a 5 per cent gelatin solution arrested the hemorrhage in a few minutes." It is essential that the gelatin be pure and sterile. There is a specially prepared, sterile, 10 per cent solution on the market. We look upon this as a new use for gelatin, but Dr. Y. Miva, a Japanese physician, tells us that it was used as a hemostatic by the Chinese 1,600 years ago.

Glutol.—A compound of formaldehyd and gelatin. A white powder, insoluble in water or alcohol. Used as an antiseptic covering for wounds, sores, etc., applied full strength. Is also used as a local styptic.

Guaiacol.—The chief constituent of creosote. Is now synthetically produced from pyro-catechin. Is a colorless, oily liquid, with a characteristic aromatic odor. It is an anti-tubercular, antiseptic and local anodyne. Dr. Marichal of Havana considers it equal to cocain in tooth extraction. He uses a 10 per cent solution in olive oil for injection. It is also recommended as a remedy in pulpitis.

Holocain.—A local synthetic substitute for cocain. A white crystalline powder, soluble in 50 parts of water. Its solution can be boiled without decomposition. Is used in a 1 per cent solution, mostly in eye diseases. Is considered too toxic for subcutaneous use.

Hydrogen Dioxid.—U. S. P. title, Dioxid of Hydrogen Water. Contains 3 per cent by weight of the gas, which equals 10 volumes of available oxygen. Used extensively by the medical and dental profession. All aqueous solutions contain free acid, added to make it more durable. Some claim there is enough present to injure the enamel of the teeth when used in the mouth full strength. With this in mind, I wrote Squibb and received the following: "Our product when freshly made and as put up contains about .02 of 1 per cent of free acid. The amount of acidity, however, frequently increases with time, and therefore our product usually shows an actual increasing acidity the older it is. As to the acidity being sufficient to endanger the enamel of the teeth, we much doubt, but a series of definite experiments in that line would surely be in order, and you gentlemen are the ones to give us the results of your investigations." The free acid can be neutralized by adding bicarbonate of sodium to the solution, but when so treated it should be used soon, as it decomposes and loses its oxygen much more rapidly in an alkaline medium. Dioxid of hydrogen water when heated on a water-bath, not above 140 degrees F., loses chiefly water. There-

fore, to obtain it in a concentrated form, we merely evaporate the regular 3 per cent solution. The greater the pressure on the cork when opened, the greater the loss of oxygen. Oxygen when once liberated from the solution cannot be reunited by agitating the bottle or otherwise. I have seen it recommended, for preserving, to place bottle containing the dioxid in water, stoppered end down. This does not keep it any longer.

Hydronaphthol.—A few years ago, during the dental boom in this drug, I wrote a leading New York chemical house in regard to it and received the following reply: "We beg to state that investigations appear to prove that hydronaphthol is simply an impure betanaphthol. In view of this, the statement that its antiseptic action is greater than that of pure betanaphthol is probably an error."

Ichthyol (*Ammonium Ichthyol-Sulphonate*).—Obtained from the dry distillation of a bituminous quartz containing fossil fish remains in great quantities. This rock is found in certain parts of Europe. It is a thick brown liquid, bituminous odor, soluble in water. An antiphlogistic, antiseptic and alterative. Considered by dermatologists as one of the most reliable antiphlogistics. Is used in dentistry in the treatment of pyorrhea, applied topically in 25 per cent glycerin solution or mixed with lanolin.

Iodoform.—Prepared by heating together iodin, potassium bicarbonate and alcohol. It contains 96 per cent of iodin. Squibb says: "It still holds its own very effectively notwithstanding the repeated presentation to the profession of claimed substitutes." Considering that we have reliable substitutes, I think it is seldom necessary for the dentist to use this disagreeable drug about the mouth. Dr. G. E. Crawford of Iowa expresses about my sentiments on this remedy. He says: "Iodoform is one of the feeblest antiseptics—in fact, it must be sterilized itself before it is fit to use at all, and if used freely is more likely to poison the patient than the microbes. There is no good reason why this 'skunk' of modern surgery should not be banished from respectable society."

Iodyloform.—A recent substitute for iodoform. Is a combination of iodin and gelatin, in the form of a yellowish-brown powder, odorless and insoluble in water, alcohol or ether. It contains 10 per cent of iodin and is non-toxic.

Lysoform.—A combination of lysol and formaldehyd. A thin, soapy product, soluble in water and alcohol. Is recommended as a

valuable disinfectant for the hands. Dr. P. Strassman of Berlin says a 5 per cent solution is as efficient as a 1 to 1,000 solution of mercury bichlorid.

Lysol.—A saponified product of coal-tar, chiefly composed of cresols. Is a brown, oily liquid, soluble in water, alcohol and glycerin. Is used as a substitute for carbolic acid in ½ to 2 per cent solutions. The cases of poisoning with this drug appear to be increasing. Dr. Geo. Burgl of Bavaria enumerates 18 cases of intoxication on record in the literature of the past year.

Naphthol-Beta.—A coal-tar derivative. Made official in the 1890 Pharmacopeia. A powerful antiseptic and bactericide. Considered one of the best intestinal antiseptics known. Used externally, principally by the dermatologists as an antiseptic and parasiticide. I have used it successfully in 25 per cent alcoholic solution as an antiseptic in root canals and to disinfect cavities before filling. Its two principal objections are: 1. Turning dark of the solution. 2. A somewhat disagreeable odor.

Nargol.—A new chemical compound of silver and nucleic acid, containing 10 per cent of silver. A light brown powder, soluble in water. Does not coagulate albumen nor stain the tissues, and is claimed to be more penetrating than silver nitrate. Dr. A. G. Whippern of Chicago, writing in the *Medical News*, reports "Three Obstinate Cases of Empyema of the Maxillary Antrum" cured with injections of solution of nargol. Is used in 5 and 10 per cent aqueous solutions.

Narkotil.—I quote the following from Merck's Archives: "Narkotil, states Dr. T. Eastham, is an ether obtained by the direct action of hydrochloric acid on the distillate of a mixture of ethyl and methyl alcohol. . . . It occurs as a colorless, exceedingly volatile liquid of a pleasant odor; it is inflammable. . . . Is used for inducing narcosis. . . . Its general action is said to be quite similar to that of ether."

Nervocidin.—The active principle of an East Indian plant called "*gasubasu.*" Appears as a yellow powder, freely soluble in water. It is a paralyzing poison, has toxic symptoms, and causes irritation. Has been recommended as a local anesthetic, a pulp devitalizer and an obtundent of sensitive dentin. Its anesthetic properties are lasting, but weak solutions cause severe inflammation when brought in contact with living tissues. Theodore Söderberg of Sydney,

N. S. W., recommends it, mixed with cocain, as an efficient obtundent for sensitive dentin. He cautions, however, against using it in deep-seated cavities. He reports on the use of this remedy in the November, 1901, and August, 1903, *Cosmos*. Its principal use from a dental standpoint will probably be as a pulp devitalizer; and it surely should be tried in those cases where the application of arsenious acid is not feasible. It does not cause sloughing if brought in contact with the gum, and produces no bad symptoms.

Nervanin.—This synthetic substitute for cocain has not received much comment in the medical or dental literature of the past year. It appears in colorless crystals, freely soluble in water. Is claimed to be ten times less poisonous than cocain. Has distinct antiseptic properties even in 1 per cent solutions, and can be boiled without decomposition. Dr. D. H. Ziegler of Cleveland has experimented quite extensively with this drug. His results are published in October, 1901, *Cosmos*. It is generally used in 2 to 5 per cent solutions.

Oils Essential.—Emulsions of some of the volatile oils have been recommended for hand sterilization. According to Merck, Calvello has made comparative tests regarding the bactericidal properties of certain oils as compared with a 1-1000 solution of mercuric chlorid, and has found that a 7 to 8 per cent emulsion of cinnamon oil or a 10 per cent solution of thyme oil, in washing the hands, has the same sterilizing action as the solution of mercuric chlorid, without possessing the disagreeable secondary properties of the latter. The most powerful action is obtained with a 90 per cent emulsion of cinnamon oil, which effects complete sterilization.

Orthoform.—A synthetic local anesthetic constituted like cocain. A white, odorless powder, slowly soluble in water. Used principally as a local anodyne, applied pure or in form of ointment, to painful wounds, burns, etc. Recommended in certain kinds of toothache and claimed to be especially efficient in those cases of extreme pain following extraction. For the latter use it is made into a stiff paste with glycerin or olive oil, and packed into the painful socket. Owing to the increasing number of poisoning cases it is now being used with more caution.

Papain.—A vegetable digestive ferment obtained from the unripe fruit of *Carica Papaya* or "Pawpaw." Has been recommended for digesting recently devitalized pulps, i. e., that portion remaining in inaccessible root-canals. It is superior to pepsin, in that it is active

in alkaline, acid or neutral mediums. Is a whitish hygroscopic powder, soluble in water and glycerin.

Paraform (*Trioxymethylene*).—The polymeric form of formaldehyd. Appears as a white powder, insoluble in water, alcohol or ether. Is a powerful antiseptic and an escharotic. It can be prepared by evaporating a 40 per cent solution of formaldehyd. As the water evaporates the paraform gradually precipitates from the solution. It is used in dentistry as a permanent root-canal filling, mixed with other material. Also for treating putrescent pulps and for generating formaldehyd gas.

Pental (*Tri-Methyl-Ethylene*).—Formerly known as amylene. A few years ago this agent was a favorite anesthetic for minor operations, but lately many prominent observers have cautioned against its use on account of its being a dangerous cardiac depressant. I think it stands at the head of anesthetics in regard to mortality, which is 1 in every 162.

Phenacetin.—Prepared by the action of glacial acetic acid on paraphenetidin, a body obtained from phenol. A white, tasteless, crystallin powder. Is an antipyretic, antineuralgic and analgesic. The *National Dispensatory* says this drug, "by allaying pain tends to promote sleep, and in local inflammation and congestion to diminish swelling." This would seem to especially recommend it for dental use in cases of acute pericementitis leading to alveolar abscess. Phenacetin has slight if any toxic properties and rarely excites vomiting, ringing in ears, etc. I have used it with very satisfactory results. Have never had any untoward symptoms and consider it one of the best and safest of the milder anodynes. Dose, 5 to 10 grains.

Protargol.—A silver compound consisting of 8 per cent of silver combined with protein. A yellow powder soluble in water. Is an astringent and bactericide. Has been used successfully in the treatment of empyema of the antrum, in 5 to 10 per cent aqueous solutions, and is recommended as a cure for sensitive dentin due to abrasion. For the latter I have found it inferior to silver nitrate. It does not, however, stain the dentin.

Pyoktanin (*Methyl Violet*).—The analin dye "pus destroyer." A violet crystalline powder, soluble in 75 parts of water. Is an antiseptic and analgesic. Reported non-poisonous and very diffusible. Dr. R. E. Graham, writing in the *New York Medical Journal,* says:

"As a germicide and antiseptic pyoktanin stands high in the list. It destroys the vitality of anthrax bacilli in solutions of 1 to 1,100, and retards the development of pus cocci in solutions of 1 to 2,000,000. Pyoktanin when applied to an inflamed mucous membrane stains the same intensely blue; this color remains for a number of days, and of course the pyoktanin is active as an antiseptic as long as any color remains." He says it can be applied to the most delicate mucous membrane, in concentrated solution, with but slight if any irritation. Dr. Darier of France has reported several cases of cancerous growths of the face which have responded quickly to a 5 per cent aqueous solution. He appears to consider it a specific in this class of cases. Dr. Baron von Oefele of Germany has used it very successfully in subcutaneous injections for malignant growths, producing rapid reduction of carcinomatous and sarcomatous tissue. Pyoktanin solutions should be kept in dark bottles and not used when more than 3 days old. The stain produced by this drug can be removed by scrubbing with common soap, followed by alcohol.

Resinol.—I quote from Squibb: "Resinol is the name given to a secret proprietary agent recommended for all varieties of cutaneous diseases. On general principles, then, it may not be unexpected for some of the profession to discover unfortunate results, as long as they are kept ignorant of its composition." "Dr. M. L. Heidingsfield of Cincinnati reports 3 cases of dermatitis traced to the use of this agent. He states that it 'possesses dangerous antiseptic and anodyne properties.'"

Resorcin.—A diatomic phenol prepared by fusing sodium benzene disulphonate with caustic soda. Is a white crystallin powder becoming reddish on exposure. Should be kept in dark amber bottles. Soluble in 1 part of either water, alcohol or glycerin. Is an antiseptic and antizymotic. A 1 per cent solution will arrest for a long time putrefactive changes in urine, organic infusions and even animal tissues. Has been used successfully in aqueous solutions for different forms of stomatitis. Dr. J. E. Blomfield of England reports removing surgically epithelioma of the lower lip at two different times, the growth reappearing after each operation. After removing the third time he applied powdered resorcin to the wound. Since then, he states, there has been no recurrence. He further says: "There can be no doubt as to the value of resorcin in rodent ulcers."

Salol (Phenol Salicylate).—Prepared by heating salicylic acid with phenol in the presence of phosphorous oxychlorid. A white crystallin powder, insoluble in water. An antiseptic, antirheumatic and antipyretic. When taken internally, on reaching the small intestines it is broken by the pancreatic juice into phenol and salicylic acid. It melts at 109 degrees F., and has been used in this state to fill root-canals. It has been claimed that root-canals when so filled have been subsequently examined and found empty, the salol having split into its component parts. This is possible but not probable.

Septoform.—Is described as the condensation product of formaldehyd with members of the terpene, naphthalin and phenol group. Is recommended as a hand and instrument sterilizer. It does not corrode instruments, and when used for washing the hands it softens the skin but does not irritate. It has not the penetrating odor of formaldehyd. Possesses considerable germicidal power. A 3 per cent solution destroys staphylococcus pyogenes aureus in 3 minutes and typhoid bacillus in 10 minutes. Is used in 5 to 10 per cent solutions for instrument sterilization and in 3 per cent solutions for wounds. Is marketed in concentrated aqueous solutions.

Sodium Peroxid.—Prepared by heating sodium in a current of oxygen. Is a yellowish white powder. When added to water it is decomposed into sodium hydroxid and oxygen. It yields about 20 per cent of available oxygen. Is used for treating putrescent pulp-canals and for bleaching discolored teeth.

Somnoform.—A new anesthetic introduced by Dr. Rolland of France. Is a mixture of the following:

Ethyl chlorid	60 parts.
Methyl chlorid	35 "
Ethyl bromid	5 "

Dr. Chaminade of France has used it in 100 cases, and states that it is particularly valuable in minor surgery. He claims it is more rapid in action than ethyl chlorid. The principal advantages claimed for this mixture are: Instantaneous action, rapid return to consciousness and no bad aftereffects. It is administered by means of a linen cone interlined with paper to prevent evaporation. Five to 10 c.c. of the mixture are sprayed on cotton, placed in the bottom of the cone, and the nose and mouth are covered to exclude the air. It

takes from 15 seconds to 1 minute for anesthesia and lasts from ½ to 5 minutes.

Stypticin (*Cotarnin Hydrochlorate*).—Obtained by oxidizing narcotin, an alkaloid obtained from opium. Is a yellow powder soluble in water and alcohol. A hemostatic and styptic. Recommended in hemorrhage following tooth extraction. Applied pure or in 50 per cent solution.

Subcutin.—The para-phenolsulphonate of anesthesin. A local anesthetic. Practically the same properties as anesthesin but more soluble. With cold water a 1 per cent solution can be made; a 2½ per cent with hot water. The solution can be boiled without decomposition, and is claimed to have bactericidal power. The following is recommended for subcutaneous injection:

	Grams.
Subcutin	1.
Sodium chlorid	.7
Aqua Dist	100.

Sublamin.—A combination of mercury sulphate and ethylendiamin. Used for disinfecting the operator's hands after washing with soap and water. Said not to irritate. Is marketed in 1 grain red-colored tablets. Three to 6 tablets to a quart of water make the desired strength.

Sulphonol.—Prepared by the oxidation of mercaptol by potassium permanganate. Colorless crystals, tasteless, almost insoluble in water. Is a hypnotic and sedative. Should be used with care, as there are many cases of poisoning still being reported. Dose, 10 to 20 grains.

Suprarenalin.—Supposed to be the same as adrenalin, only made by a different firm.

Tachiol.—A name given to silver fluorid and offered as a new antiseptic. Appears as deliquescent crystals which are very soluble in water, the solution turning dark on exposure. Introduced to the profession by Prof. Durante of Rome. Dr. Perez found by experiments that it was greatly superior to carbolic acid, and only slightly inferior to corrosive sublimate, strength for strength, and the most potent of all the silver salts as an antiseptic. It coagulates albumen only slightly. Used in 1-10 to 1 per cent solutions.

Thiol (*Synthetic Ichthyol*).—Prepared from paraffin oils treated with sulphur at high temperature. Has the same properties and uses as ichthyol and has the advantage in being less irritating and without odor.

Thymol (*Thymic Acid*).—A stearoptene obtained from the volatile oils of thyme. Occurs in large colorless crystals, having an aromatic odor. Is readily soluble in alcohol but almost insoluble in water. Bartley says: "Thymol is a powerful antiseptic, being ten times more effective than carbolic acid." I consider it one of the best antiseptics we have and use it extensively for disinfecting deep-seated cavities and as a root-canal dressing, especially in the anterior teeth. I never permanently fill a root-canal without first swabbing the canal with a 50 per cent alcoholic solution. Then the alcohol is evaporated by drying and the thymol deposited upon the walls of the canal, thus making a permanent antiseptic lining. The two principal objections to its use in surgery are: Its insolubility in water and its property of attracting flies. These do not apply to dentistry, as we can use it for the purposes mentioned above in alcoholic solution or dissolved in oil of thyme, and as for flies, there are not supposed to be any in a dental office.

Trikresol.—An antiseptic mixture containing 35 per cent ortho-cresol, 40 per cent meta-cresol and 25 per cent para-cresol. A colorless, oily liquid, with an odor like creosote; soluble in 40 parts of water. Claimed to be a three times stronger germicide than carbolic acid and three times less toxic. Used locally in ½ to 1 per cent solutions.

Trional.—A hypnotic and sedative. White powder, faint, bitter taste. Soluble in 320 parts of water. Is closely allied to sulphonol and considered superior to it, in that it is less toxic, more prompt in its action, and produces a more natural sleep. It should not be given for any great length of time, however, as cumulative toxic symptoms are liable to appear. Dose 10 to 15 grains.

Tropacocain, Sometimes Called Tropsin.—Found with cocain and other alkaloids in the small Java coca leaves. Is now made synthetically. The hydrochlorate is generally used and appears in colorless crystals, soluble in water, which solution can be boiled without decomposition. Claimed to be only half as toxic as cocain and that anesthesia sets in more rapidly and lasts longer. Also causes much less peremia. The cost has a tendency to restrict its use, it being

four times more expensive than cocain. Generally used in 3 per cent solutions with 0.6 per cent sodium chlorid.

Vioform.—A substitute for iodoform. Is odorless and claimed to have non-toxic properties.

Xeroform (*Tribromphenol-Bismuth*).—A substitute for iodoform. A yellowish green, almost odorless and tasteless powder. There has been no literature of importance on these two agents during the past year.—*Items.*

PRACTICAL THERAPEUTICS—SEPTIC PERICEMENTITIS AND INCIPIENT ABSCESS. By J. P. Buckley, Ph. G., D. D. S., Chicago. In my last article on peridental inflammation [DENTAL DIGEST, September, 1904, p. 1147], I discussed quite generally the local remedies to be applied in the treatment of this condition, and intimated that, in my opinion, pericementitis caused by mechanical or chemical irritants can best be treated by the local application of drugs and remedies. But in those cases where this membrane has been irritated by microorganisms or their poisonous ptomaines it is necessary to resort to the internal administration of drugs.

In the earlier stages of peridental inflammation it is not always an easy matter to ascertain the *true cause* of the disturbance. For instance, in those cases following the removal of the pulp tissue it is difficult to know whether the cause is the root filling, the medicine used in the treatment, or whether we failed to *maintain asepsis* in performing the operation. I am inclined to believe that it is more frequently the latter than we are willing to admit. Certain it is that the more nearly we approach *absolute asepsis* in these operations the less peridental trouble we have.

A prolific source of septic pericementitis is escaping microorganisms and ptomaines from putrescent root-canals. It is in these cases that good judgment must be exercised and extreme care taken in order to prevent the formation of an alveolar abscess. There is no condition which we are called upon to treat wherein a practical knowledge of pathology and therapeutics will serve us better than in these particular cases. Frequently patients delay coming to the dentist until the infection has progressed to a point where all remedies will fail in aborting an abscess, but in many instances abscesses

may readily be prevented by the use of proper remedies at the right time.

In those cases where the infection comes from a putrescent root-canal, our first duty is to open into the canal and let the confined gases escape. This can be accomplished without producing much pain by firmly grasping the tooth between the thumb and forefinger of the left hand, and with a sharp bur rapidly drill into the pulp chamber. The tooth containing the putrescent pulp can be treated by one of two methods, i. e., to place some good disinfectant in the pulp chamber and cover the medicament by placing in the cavity a pledget of cotton soaked in liquid vaselin, or by selecting the proper drugs the remedy can be hermetically sealed in the pulp chamber. (I refer here only to the first treatment.) I have been using and much prefer the latter method for reasons which will be fully discussed, together with the drugs used, in a subsequent article on the therapeutics of putrescent pulps.

Your attention will now be directed to the treatment of the infected peridental membrane. The local remedies given in my last article will prove extremely useful, and in order to control the infection, and at the same time aid nature in readjusting the abnormal condition, it is not only our privilege but our duty to administer internal drugs. Alteratives are indicated, as it is desirable to change the condition at once. The great alterative drug, as is well known, is potassium iodid. This should be administered in solution well diluted. The following prescription will prove useful:

℞ Potassii iodidi ℥j.

Syrupi sarsaparillæ comp. f℥iij.

M. Sig.—Take a teaspoonful three times a day after meals.

While the above would be the general directions, I should instruct the patient in cases of septic pericementitis and incipient abscess to take a teaspoonful every two hours until three doses are taken, and then follow the directions on the label. It is well also to advise the patient to add a teaspoonful of the remedy to a half wine-glassful of water, as this further dilutes the potassium iodid, the base of our prescription.

Let us analyze this prescription. The potassium iodid is a great alterative. The compound syrup of sarsaparilla dilutes the base and also masks the taste, and has medicinal properties. It contains the fluid extract of sarsaparilla, of licorice and of senna, as well as the

oils of sassafras, anise and gaultheria. Our vehicle, then, is slightly tonic, stomachic and cathartic—all of which are valuable.

It might be claimed for this prescription that it is almost a specific remedy, yet it must be remembered that no therapeutist can tell exactly what internal remedies he would suggest without seeing the case, for, as I have stated in a previous article, there are many circumstances and conditions which modify the effect of drugs. One of these is the climate. In malarial regions, and in the spring of the year in this locality, the salts of quinin can be given with beneficial results. The salt which I have been giving in the cases under consideration is quinin bi-sulphate. Nearly all pharmacies have the various salts of quinin put up in the form of pills, and while these pills may be given, I much prefer to write a prescription for capsules. The gelatine capsule is soon dissolved in the stomach; thus we get the action of our drug more rapidly than when given in the hard, dry, pilular form. The following prescriptions can be written for the drug in two-grain doses:

℞ Quininæ bisulphatis gr. xxiv.

Ft. capsulæ No. 12.

Sig.—Take one capsule every hour until the effect is noticeable.

Quinin acts differently upon different individuals. Most adult patients know the effect of this drug upon their system, and will therefore be able to aid the dentist in determining the amount to be taken.

One of the most prominent symptoms in all pericementitis is *pain.* In many cases the pain can be alleviated by local applications, but very often, especially in septic pericementitis and incipient abscess, it is necessary to administer some drug which acts upon the central nervous system, thereby controlling the pain. There are several drugs, such as acetanilid, potassium bromid, etc., which, properly given, usually quiet the nervousness of the patient, but in many cases the pain is so severe that the dentist knows from sad experience that counter-irritation gives but slight or temporary relief, and that most of the hypnotic drugs or preparations fail to produce the desired effect. What, then, are we to do in these cases? Allow our patient to suffer until the effect of our alterative has been produced, or perhaps an abscess has developed? No! It is in these cases that we should administer that which the physician gives—whatever may be said to the contrary—when he has a patient demanding

immediate relief from pain. Opium, especially its chief alkaloid, morphin, is the one drug that can be depended upon to stop pain. Pharmacologists have proven conclusively that morphin has no local action; but all agree that when administered it acts upon and controls the central nervous system. This drug can be obtained in tablet form, containing one-eighth grain each. It is therefore never necessary for a dentist to write a prescription for the drug. In my opinion, a prescription should never be written for it, as the patient, being satisfied with the effect produced, could get the prescription refilled on the least provocation, thereby making it possible for the habit to be innocently acquired. In these cases a tablet (⅛ gr.) could be administered to the patient while at the office, and one—never more than two—given to the patient to be taken at intervals of one hour if needed.

There are many other remedies recommended by various practitioners. Those which I have discussed have served me well in the treatment of these aggravating conditions. The dentist can serve his patients better by having a thorough knowledge of a few drugs and remedies than a superficial knowledge of many.—*Review.*

DIFFICULT EXTRACTIONS. By L. G. Noel, D. D. S., Nashville. Read before the Tennessee State Dental Association, May 27, 1904. In a conversation with a professional friend a few days since he remarked: "There is no operation in which the average dentist is so unskillful as extraction." This statement set me to thinking how this subject would be received if I should present it before a body of men mostly engaged in the work of saving rather than destroying teeth. We frequently hear the statement made by our professional friends with manifest pride, "I seldom extract teeth," and "I haven't extracted half a dozen teeth in as many years." It is a commendable pride that thus vaunts itself upon salvation rather than destruction, and a most successful and remunerative practice may be conducted by a dentist who never extracts teeth; but if he discharges his duty toward his patients, he must often send them to someone else to have this operation performed, as the duties of the dental profession often call for it most imperatively.

One of the errors most frequently made is hastening to apply the forceps as soon as the tooth or root has been condemned to extraction, without making a sufficiently careful examination of the case.

The fracture of teeth or roots often results from the too hasty and inconsiderate application of force—a mishap that may be avoided by first making a thorough study of the case. Frequently too much force is applied, or too much cutting of the alveolar process, when a testing of the solidity of the root before applying the forceps would have revealed its weakness and perhaps have led to a different method altogether—possibly the elevator instead of the forceps. The careless operator has often felt shame for the heroic bite he has taken with the alveolar forceps to extract a contemptible little stump that he could have easily overturned with the elevator.

The exploring needle in the hands of a skillful dental surgeon whose touch has been "educated" locates hidden roots, abscess cavities, necrotic tissues, and phagedenic destruction of bone. Its revelations are swifter and surer under some conditions than the X-ray diagnosis. (I would not detract anything from the merit of the X-ray, so ably set forth by Dr. Kells in his valuable paper read before the National Dental Association at Asheville last summer.) [DENTAL DIGEST, January, 1904, p. 1.]

In locating malplaced and unerupted third molars this method is unequaled, but there are comparatively few dental surgeons provided with the facilities or equipped with the skill and training in the art of skiagraph pictures necessary for making this kind of diagnosis. No one will dispute the value of this insight into the hidden things of nature, and when all other means have failed to give the operator a fairly clear mental picture of the case, before proceeding he should resort to this, even if it is necessary to call in the aid of a specialist in the work.

Your essayist has had some experience in extracting impacted third molars and he knows that in some cases it is a surgical operation requiring a high order of skill as well as one that taxes the patience, ingenuity, and ability of the dental surgeon. In many instances the lower third molar lies tilted anteriorly, with its masticating surface in apposition with the distal surface of the second molar. We find these cases presenting all angles of inclination. Sometimes the masticating surface is in close adaptation to the distal surface of the second molar, and the third molar lies with its longitudinal axis in a horizontal relation to the other teeth. When this is the case the extraction of the tooth is almost impossible without first cutting away the bone overlying the roots and down

beside the tooth, lingually and buccally, enough to admit of grasping it with the forceps. Efforts to remove these teeth without such preliminary measures are sure to result in failure and often in fracturing the bone and tooth, causing fracture of the crown of the adjoining second molar, and resulting in disaster and failure.

In these cases I prefer ether to any other general anesthetic, for nitrous oxid is too evanescent in its effects, and produces a spasmodic contraction of the temporal and masseter muscles that is very undesirable. With many patients I find the injection of nirvanin all that is necessary. When this local anesthetic is employed the syringe should be in good order, have all its fittings tight, so that the fluid can be injected into the peridental membrane slowly until the gum is whitened by the pressure of fluid in the tissues. The needle should be inserted at several points about the field of operation, and time should be allowed for the dessemination of the drug through the tissues. I usually wait from ten to fifteen minutes after injecting the fluid before commencing my operation.

For cutting away the bone I use bud-shaped burs. These may be for both the direct and the right-angle handpiece. The hemorrhage following the cutting of the gum and periosteum is quickly checked by applying adrenalin chlorid. The progress of the work of cutting away the bone should be noted from time to time by syringing and wiping out the wound with absorbent cotton. When the bone has been removed from over the distal root, and sufficient of the crown has been exposed for obtaining a hold, it may be grasped with a pair of Hutchinson's forceps and removed. In some cases I have worked the cow-horn forceps to advantage, they being a powerful lever. The wound will require daily syringing with dioxygen until granulations have filled the cavity, and even then the patient should be instructed to use constantly an antiseptic mouth wash.

Another class of cases that may be extracted piecemeal, by the use of the bud and flame-shaped burs in the dental engine, is that of the so-called "goose-quill roots," where caries has followed down the pulp chamber and destroyed the dentin until little but a shell of cementum remains. This shell may be burred out with the flame-shaped cavity burs, and when a portion of one side has been removed the remainder may be dislodged with a small sickle scaler, a hoe-shaped excavator, or almost any hooked instrument that will enter the cavity. This is better surgery than biting through the

alveolar process and cutting a deep trench in the bone with a pair of alveolar forceps. Many of these roots that have abscessed will be found so loosened by disease as to be easy to dislodge with a dentated elevator.

I shall not feel that I have discharged my duty if I do not inveigh against the practice of using so recklessly the alveolar cutting forceps for biting out these roots. We all know from observation that in so doing we remove more bone than would be taken away by the natural process of resorption, for we have all been annoyed by these deep trenches that we find so difficult to restore with any artificial substitute, and we have frequently had occasion to regret the sunken and pinched expression thus imparted to the face. When it is our purpose to restore the lost teeth with bridgework, especially in the front of the mouth, we should avoid this reckless destruction of bone.—*Headlight.*

VARIATIONS IN THE ATMOSPHERIC PRESSURE AND THEIR INFLUENCE UPON THE INHALATION OF ANESTHETICS. By H. Bellamy Gardner, London. (*Brit. Jour. of Dent. Sc.*) The daily and even hourly variations in atmospheric pressure to which the inhabitants of the earth are subjected, and that also which is produced by distance from sea level, have a marked influence on the absorption and elimination of anesthetic vapors. Sir B. W. Richardson pointed out that variations in temperature and in the relative amount of moisture in the air affected the inhalation of anesthetics, a moderately high temperature and a dry air assisting the vaporization of liquids and the elimination of gases from the blood.

The essayist has carried on a series of experiments, the results of which are embodied in a table showing the available period of anesthesia with nitrous oxid and oxygen under different conditions of atmospheric pressure and temperature. We thus find that under a pressure of 29.35 inches the available period was forty seconds, and with a pressure of 30.44 inches the available period was fifty-seven seconds. Between these two experiments the period of anesthesia varied in direct ratio to the atmospheric pressure.

During the past three and one-half years the author has confirmed these observations in a large number of cases both in hospital and in private practice, and has come to the definite conclusion that

a higher barometric pressure produces greater tranquillity and longer anesthesia, and that more oxygen or air may be admitted in these circumstances without excitement resulting from its presence.

These phenomena are precisely those which Paul Bert predicted from calculation and demonstrated by experiment in the air-tight chamber he had made for producing an increased atmospheric pressure during the administration of nitrous oxid and oxygen. Bert's experiments were repeated by Claude Martin in 1883, who obtained better results by maintaining a pressure of 44 inches rather than the pressure of 38.8 inches advocated by Bert.

Discussing the influence of barometric pressure upon chloroform inhalations, the author states that chloroform is more popular as an anesthetic in those places where barometric pressure is the lowest. The density of chloroform vapor is four times greater than that of air, and its potency upon the living organism is about seven times stronger than that of ether. As an inhalation it therefore forms what is generally considered an easy vapor, a few drams only of liquid, instead of ounces, requiring to be evaporated to produce unconsciousness, while the weight of the vapor itself tends to prevent its dissipation. These qualities, though rendering the fluid portable, and the apparatus required for its administration very manageable, are the true cause of danger to a patient who has been brought too close to the state of chloroform overdosage, by rendering its elimination from the blood comparatively slow at the ordinary atmospheric pressures. Bearing in mind the factor of potency above mentioned, the reason for the difference in effect of low barometric pressure upon the anesthetic qualities of nitrous oxid and ether on the one hand and chloroform on the other becomes easily perceptible, for in the case of the first two drugs, which are comparatively weak anesthetics, we require to administer, speaking generally, as much as we can of them to attain tranquillity, and require a higher barometric pressure to help us in retaining them in the blood; but in the case of chloroform, so great is the potency for even small quantities of the vapor, and so narrow is the path that leads along the cliff between tranquillity and respiratory paralysis, that low barometric pressures will render it more safe by delaying absorption and aiding its elimination from the blood, and higher pressures on the other hand will render it more dangerous.

The difference between the results of the experiments on animals by the first and second Hyderabad commissions and the results observed in London and Edinburgh are attributed to the difference in atmospheric pressure between the three places named. The main atmospheric pressure of Hyderabad is below 28 inches, while that of Edinburgh is 29.84, and that of London between 29.94 and 29.95.

From the foregoing observations we gather—First. That during periods of low pressure, or at altitudes where the barometer registers 29.4 inches and under, nitrous oxid will yield shorter available anesthesia. Further, that the less oxygen is mixed with nitrous oxid the shorter will be the period of excitement. Second. That ether does not produce as good results under conditions of low pressure as under high pressure. Third. That the administration of chloroform should be cautiously and carefully carried out in regions in which the pressure is high; thus in ordinary positions near sea level, where the pressure is equal to 30.2 or even 31 inches, one-third part of ether with two-thirds of chloroform, instead of chloroform alone, would materially increase the patient's safety, while pure ether would be not only indicated, but would be the surest agent.

SEPTICEMIÆ OF BUCCO-DENTAL ORIGIN. By Dr. C. Sabatier. (*Schweiz. Vierteljahrs. für Zahnheilkunde.*) Systemic infections of dental origin may be classified under three important headings, namely, chronic septicemia, acute septicemia, and pyemia. It was in 1865 that Richet called attention to the occurrence of systemic phenomena following operations in the mouth and fractures of the maxillæ. Others have mentioned the possibility of serious general intoxications of dental origin, but nowhere has it been possible to find an exhaustive study of this question. The author discusses the mouth from the point of view of its suitability as a medium for the development and growth of bacteria. He reviews the varieties generally found therein, saprophytic and pathogenic, and the means of defense of the buccal cavity, before taking up in detail the three great varieties of septicemia. He discusses all these types of septicemia in a most exhaustive way, giving a classified list of fifty-six cases collected from the literature on the subject, and sums up as follows: 1. The buccal medium contains normally a certain number of microorganisms, which, while being of the pathogenic variety, seem to live as saprophytes. 2. If from any cause

they should regain their activity they are capable of giving rise to infections of various forms. 3. It has been observed that serious complications occasionally follow lesions of the teeth and suppurations of the gingivo-dental region and stomatitis, owing to a systemic intoxication by varieties of microbes or their toxins. 4. These intoxications, which belong to the type of septicemiæ, may be of the following varieties: (a) Chronic septicemiæ, almost always consecutive upon prolonged suppurations of the gingivo-dental region. (b) Acute septicemiæ which are stages in the course of chronic septicemiæ or else true acute attacks following surgical interventions or other causes which render the organism more vulnerable. (c). Acute septicemiæ can be divided into three groups: acute non-localized septicemia, acute lymphatic septicemia, and acute phlebitic septicemia. (d) Finally, in certain cases true pyemia develops, or intermediate forms between septicemia and pyemia. 5. In the majority of cases the prognosis of acute septicemiæ is fatal. However, there are certain forms which, while of very severe nature, do not terminate fatally, either because of timely rational therapeutic interference or because they develop in strong organisms free from organic lesions or diatheses. 6. The possibility of severe intoxications following suppuration of the gingivo-dental region explains the necessity of combating by all the means at our disposal any suppuration, whatever be its degree of intensity.

"THEORETICAL" AND "PRACTICAL."—Knowledge is gained primarily through the different senses, of which sight, hearing, and touch are the most important. We must further distinguish between clinical or practical work, in which experience is gained at first hand, and so-called theoretical work or the accumulated experience of others conveyed by means of lectures and books. Each of these classes is essential for the proper understanding of any practical science. The man who relies too much upon his lectures and books will possess that kind of knowledge which is frequently miscalled theoretical; it is not really theoretical; it is condensed and comprehensive knowledge which is true, and may have definite and distinct practical bearings. The weakness of its possessor lies in his inability, owing to want of familiarity with actual practical details, to so apply his knowledge as to be able to deal successfully with the cases that come before him. On the other

hand, the man who has neglected these opportunities in favor of an extensive clinical experience is on the whole perhaps in a more happy position, but his defects are very obvious. Owing to the impossibility of his attaining anything like a complete acquaintance of even a small subject, his knowledge is scrappy, disconnected, unequal, and wanting in coordination. He has, as it were, endeavored to learn his subject afresh; he has neglected to avail himself of the advantages of the crystallization of knowledge by time, and his sense of proportion and perspective is defective. The art of remembering consists partly in perfect observation and understanding of the point before you, and partly in its connection with previously-acquired items of information. It is much easier to remember some scientific truth, or observed fact, which has a definite bearing upon the general scheme of things, than one which stands alone. There is, if I may say so, far too great a tendency among students to regard their book work and their practical work as two distinct things. Such a view is fatal to good knowledge. It is absolutely wrong to do as so many do, and rely upon practical and clinical work for the acquirement of information during the first year or year and a half of your hospital course, and to turn to your books merely for the purpose of learning up so many facts for examination purposes. Both avenues should be traveled concurrently—or at least alternately. It is true that a first reading of a book on a subject of which you have no practical knowledge will apparently teach you very little, but it will give you a general idea of the systematic arrangement of things, and enable you to tick off, as it were, in your mind the various details as you come across them at random in practice. This will enable you to refer more readily to your books for the explanation of those difficulties which occur to you from time to time.—Norman G. Bennett, *Record.*

DISCOLORATION OF GOLD FILLINGS. Discoloration of gold fillings, even in the early days of the use of the material, attracted the attention of the profession, and various reasons were offered for this, which to-day are still recognized causes. Among these may be mentioned improper cavity preparation, including insufficient removal of decay and insufficient marginal extension. In the former defect the gold next the floor and cavity walls, being necessarily not well condensed, becomes very absorbent to the pro-

ducts of the progressing caries under it. This process extends to the margins of the filling and a discolored edge results, due to the penetration into the substance of the filling of the products of the carious process. In the latter defect the failure to extend the margins not only does not hide the filling completely and prevents the light from being reflected directly forward from it (I am referring particularly to approximal fillings in the anterior teeth), but also by its very position prevents access to all cleansing agents—the saliva, the lips, and the tooth-brush—and has not the appearance of the perfect gold filling. Another frequent cause is insufficient surface condensation. The operator's attention may be diverted while condensing the last layers of gold, and he fails to obtain the proper finish. He burnishes, polishes, does not dare to make new imprints with the mallet into the already flush surface, and the filling lacks that smooth, glossy polish of the perfect gold filling. Such a surface, as well as the dull pumice-stone finish, is very inviting to discoloration. Still another cause is the incorporation into the gold of foreign substances during the insertion of the material. This may happen in connection with combination fillings. Scraps of tin, amalgam, or metallic flakes from the instrument used will in time mar the surface of a filling. Here it may also be mentioned that excessive burnishing with steel instruments tends to discolor gold fillings. Combining tin with gold to fill at the cervical margin or the major part of the cavity, or combining amalgam with gold—in all such combinations if extreme care be not taken in finishing the baser metal will be rubbed on or impregnated into the surface of the nobler metal. Even the very fact that a large mass of amalgam is in contact with a small mass of gold may in the course of time produce a slight discoloration in the gold. Furthermore, there may be a possibility that the fineness of the gold used is at fault, though this can hardly be the case at the present day. The action of sulfids, either taken in with the food or produced chemically in the mouth, is another reason for discoloration, and these agents are invariably present to a greater or less extent in all mouths. The mouths of febrile patients, as well as those of some in health, are often found to be in an exceptionally dry state. Such a condition is very favorable to the action of chemical agents and organic forms of life, and a deposition takes place which is a common cause for discoloration. —Paul B. Engel, *Headlight.*

The Dental Digest.

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Where All Communications Should be Addressed.

Editorial.

EDUCATING THE PUBLIC DENTALLY.

At the last meeting of the New York State Dental Society Dr. M. L. Rhein referred to the antiquated and erroneous views on dentistry which appear from time to time in the newspapers, and which instead of educating the public must have the opposite effect. He stated that no less than thirty clippings of an article published in one of the New York papers were sent to him by patients, which was an evidence of the attention paid to such matters. The article was supposedly an interview with a "prominent" dentist, in which the opinion was expressed that the great loss and poor quality of teeth at the present time were due to the frequent cleansing and polishing of those organs by dentist and patient. This of course sounds very silly and ridiculous, but it is no more damaging in its results nor erroneous in its teachings than many other utterances which are found in the daily press. Two months ago a paper in Pennsylvania published the following—"If you want to have teeth like polished ivory, take a piece of chamois skin, dip it in lemon juice, and rub the teeth until they are hot to the touch." We could quote many other similar items, but our readers will remember having seen same from time to time in our columns. Dr. Rhein proposed that the Society appoint a committee of three to write an article on the "Prophylactic Care of the Teeth," for distribution at the cost of publication, and to be furnished to the newspapers throughout the state. No names were to appear on the pamphlet, simply the statement that it was authorized by the New York State Dental Society. There is nothing new in this plan, but it is none the less valuable. A few dental societies have on one or more occasions appointed

committees for a similar purpose, but only in isolated cases has anything been accomplished, and even then the results have been only temporary. It is high time that the profession took some steps towards educating the public mind upon the subject of its teeth, for on no other is it so ignorant or gullible, and the misleading newspaper articles in question simply make a bad matter worse. For various reasons the work cannot be done by individuals, and the enlightenment must come from the various dental organizations. We trust every dental society in the country will take some action at its next meeting toward this end.

PROPER REMUNERATION FOR AN ASSISTANT.

In our October issue Dr. N. S. Hoff made a few remarks concerning the dentist's assistant, and after describing the ideal assistant he said, "It is not to be expected that an assistant who is able to do all these things well can be employed at a small salary. She should command good pay and be thus encouraged to increase her usefulness." A few days after the journal was mailed we received the following communication from a young woman in a small New England town—"I was reading the Dental Digest the other day and saw on page 1193 in October number that an assistant should get a large salery. I work in a dentist office and my work consists of keeping the office tidy and helping Dr. at the chair, setting up plate teeth and other such jobs and going on errands for him. Now will you please state what salery I should get by rights, please state the heightest and the lowest." We are accustomed to receiving letters of inquiry upon almost all subjects, dental and otherwise, and ordinarily it is our pleasure to reply to same, but in this case we did not feel equal to the task of enlightening our correspondent without disillusionizing her and stunting the growth of a commendable ambition. We therefore referred the matter to Dr. Hoff, for having inveigled us into the predicament it seemed only fair that he should extricate us if possible. We trust this experience will teach him a lesson, and that hereafter he will be chary of making extravagant statements. It will be strange if his socialistic utterances have not caused one New England dentist to lose the services of a most efficient assistant, and added one more to the vast army of discontented toilers.

Notices.

SPOKANE (WASH.) DENTAL SOCIETY.

The Spokane (Wash.) Dental Society held its annual meeting Nov. 5, 1904, and elected the following officers: President, J. W. Dunning; Secretary, C. C. Mann; Treasurer, A. S. Oliver.

OHIO STATE DENTAL SOCIETY.

The thirty-ninth annual meeting of the Ohio State Dental Society will be held at the Great Southern Hotel, Columbus, Dec. 6-8, 1904. The profession is cordially invited to attend.

S. D. RUGGLES, Secy.

CALIFORNIA STATE BOARD OF DENTAL EXAMINERS.

The California State Board of Dental Examiners will hold a meeting for the purpose of examining applicants for license, commencing Dec. 15, 1904, in San Francisco. For further particulars address the Secretary.

F. G. BAIRD, Secy., 502 Sutter St.

ESSEX COUNTY (MASS.) DENTAL SOCIETY.

The Essex County (Mass.) Dental Society was organized at Salem, Nov. 1, 1904, and the following officers were elected: President, E. O. Richards, Salem; Vice-president, M. E. Davenport, Beverly; Secretary and Treasurer, P. Phillips.

ROCKFORD (ILL.) ODONTOLOGICAL SOCIETY.

The Rockford (Ill.) Odontological Society held its annual meeting and banquet Nov. 18, 1904, and the following officers were elected: President, C. B. Helm; Vice-president, A. M. Harrison; Secretary and Treasurer, F. A. Eastman; Member Board of Censors, A. B. Culhane.

INSTITUTE OF DENTAL PEDAGOGICS.

The Institute of Dental Pedagogics will hold its annual meeting at Louisville, Ky., Dec. 28-30, 1904. This has come to be the most important gathering of the year, and no teacher or practitioner interested in dental education can afford to miss the meeting.

W. E. WILLMOTT, Secy., Toronto.

SALT LAKE CITY ODONTOLOGICAL SOCIETY.

The Salt Lake City Odontological Society held its annual meeting Oct. 19, 1904, and elected the following officers: President, A. C. Wherry; 1st Vice-president, W. L. Eilerbeck; 2d Vice-president, C. W. Gates; Secretary, F. W. Meakin; Treasurer, W. C. Green; Member Board of Censors, E. Van Cott.

F. W. MEAKIN, Secy.

DISTRICT OF COLUMBIA DENTAL EXAMINING BOARD.

The next semi-annual examination of the District of Columbia Dental Examining Board will be held in Washington, Jan. 4-6, 1905. All applications for examination must be sent to the Secretary on or before January 1st, and be accompanied by a fee of $10.

W. E. DIEFFENDERFER, Secy., Washington.

LA SALLE COUNTY (ILL.) DENTAL SOCIETY.

The dentists of La Salle and adjoining counties met at Streator, Oct. 24, 1904, and organized the La Salle County Dental Society. The following officers were elected: President, C. R. Taylor, Streator; Vice-president, R. W. Morseman, Peru; Treasurer, T. J. Barrett, Ottawa; Librarian, R. D. Moran, Kinsman.

WARREN COUNTY (ILL.) DENTAL SOCIETY.

The Warren County (Ill.) Dental Society was organized at Monmouth, Nov. 12, 1904, and the following officers were elected: President, H. W. McMillan, Roseville; Vice-president, R. W. Hood, Monmouth; Treasurer, A. W. Glass, Monmouth; Secretary, O. M. Daymude, Monmouth; Librarian, W. H. Stotts, Monmouth.

NORTHWESTERN UNIVERSITY DENTAL SCHOOL ALUMNI ASSOCIATION CLINIC.

The Alumni Association of the Northwestern University Dental School will hold its annual clinic Jan. 17, 1905, at the University Bldg., Lake and Dearborn streets, Chicago. All members of the profession are cordially invited to attend. Exhibitors may procure space by addressing Dr. C. R. E. Koch, at above address.

G. B. MACFARLANE, Secy., 70 State St.

NORTHERN INDIANA DENTAL SOCIETY.

The sixteenth annual meeting of the Northern Indiana Dental Society was held at Huntington, Oct. 18-19, 1904, and the following officers were elected: President, J. A. Stoeckley, South Bend; Vice-president, Otto U. King, Huntington; Secretary and Treasurer, F. M. Bozer, Logansport; Supervisor of Clinics, D. E. Delzell, Logansport. The next annual meeting will be held at Logansport.

SOUTHERN ILLINOIS DENTAL SOCIETY.

The nineteenth annual meeting of the Southern Illinois Dental Society was held at Belleville, Oct. 18-19, 1904, and the following officers were elected: President, J. K. Conroy, Belleville; Vice-president, W. G. Carney, East St. Louis; Secretary, H. K. Barnett, Upper Alton; Treasurer, C. E. Byington, Harrisburg; Executive Committee, E. L. Burroughs, Chairman, Edwardsville; G. W. Entsminger, Carbondale; L. H. Kraft, Collinsville.

CENTRAL MISSOURI DISTRICT DENTAL ASSOCIATION.

The Central Missouri District Dental Association was organized at Sedalia, Nov. 22, 1904, and the following officers were elected: President, F. M. Fulkerson, Sedalia; Vice-president, W. M. Carter, Sedalia; Corresponding Secretary, J. R. McGraw, Fayette; Recording Secretary and Treasurer, M. L. Myers, Sedalia.

KNOX COUNTY (ILL.) DENTAL SOCIETY.

The dentists of Knox County met at Abingdon, Oct. 22, 1904, and organized the Knox County Dental Society. The following officers were elected: President, J. D. Cabeen, Galesburg; Vice-president, F. C. Lander, Knoxville; Treasurer, D. J. Griswold, Galesburg; Secretary, C. L. Rork, Abingdon; Librarian, J. F. Flynn, Galesburg.

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

The fifty-eighth annual meeting of the Pennsylvania Association of Dental Surgeons was held at the Continental Hotel, Philadelphia, Oct. 11, 1904, and the following officers were elected for the ensuing year: President, M. I. Schamberg; Vice-president, A. N. Gaylord; Secretary, J. Clarence Salvas; Treasurer and Librarian, Wm. H. Trueman.

J. CLARENCE SALVAS, Secy.

FIRST DISTRICT DENTAL SOCIETY OF THE STATE OF NEW YORK—36TH ANNIVERSARY MEETING.

The First District Dental Society will celebrate its 36th Anniversary with two great meetings in New York on the 12th and 13th of December. The essayists of these meetings will be Dr. G. V. Black of Chicago and Dr. E. K. Wedelstaedt of St. Paul. Dr. Black will read an exhaustive resumé on the subject of "Extension for Prevention," illustrating his lecture with 125 or more lantern-slide pictures. Dr. R. H. Hofheinz will open the discussion. On December 13th Dr. E. K. Wedelstaedt will read a paper on "The Packing of Gold in Approximo-Occlusal Cavities in Bicuspids and Molars," illustrating his method by the use of clay in large wooden models of teeth. The discussion of this paper will be opened by Dr. G. V. Black, followed by Dr. R. Ottolengui and Dr. B. Holly Smith. These meetings will be held at the New York Academy of Medicine, 17 West 43d Street, at 8 p. m.

In addition to these meetings the Clinic Committee has arranged for a most interesting clinical exhibition, to be held during the afternoons of these days at the Grand Central Palace, Lexington Avenue and 43d Street. This program comprises porcelain work, X-ray, orthodontia, different methods of packing gold, exhibits of different anatomical and histological specimens, etc. Dr. Black will exhibit new instruments for testing the finger power in the handling of operative instruments. Every facility will be afforded to enable the largest number to witness the demonstrations. The entire morning of both days will be devoted to manufacturers' exhibits,

which will be an interesting feature of the program. All communications pertaining to Clinics or Exhibits should be addressed to the chairman of the Clinic Committee, Dr. S. L. Goldsmith, 129 East 69th Street.

The following dental societies have been officially invited to meet with us: The New York Institute of Stomatology, the New York Odontological Society, the New York Institute of Dental Technique, the Second District Dental Society of the State of New York, the Central Dental Association of Northern New Jersey, the Hartford Dental Society and the New Haven Dental Society. A cordial invitation is extended to all members of the dental profession, and it is confidently expected that a large number of prominent dentists will be in attendance.

A. M. MERRITT,
A. G. LANSING,
F. L. FOSSUME, Chairman,
} Executive Committee.

News Summary.

J. L. O'NEAL, a dentist at Talbotton, Ga., died Nov. 9, 1904.

S. M. ULREY, a dentist at Georgetown, O., died Oct. 31, 1904.

R. C. CORBUS, a dentist at Hull, Ia., died Nov. 23, 1904, of appendicitis.

W. R. LOVE, a dentist at Charlotte, N. C., committed suicide Nov. 4, 1904.

CHARLES H. MOSLEY, 76 years old, a dentist in Brooklyn, died Nov. 7, 1904.

J. T. SNOW, 76 years old, a dentist of Whitehall, Mich., died Oct. 30, 1904.

JOHNSON LOW, a dentist at Shabbona, Ill., died Oct. 28, 1904, after a long illness.

A. W. MARTIN, a dentist at San Francisco, died Nov. 2, 1904, of heart failure.

J. G. THOMPSON, 83 years old, a dentist at Coatesville, Pa., died Nov. 10, 1904.

GEORGE A. YOUNG, 70 years old, a retired dentist at Concord, N. H., died Nov. 11, 1904.

J. J. RICHTER, 29 years old, a dentist at Oshkosh, Wis., died Oct. 26, 1904, of tuberculosis.

J. A. TIGNER, 76 years old, a dentist at Rome, Ga., died Oct. 26, 1904, after a long illness.

DIVORCE.—Theo. S. Higgins, a dentist of San Francisco, has been sued for divorce by his wife.

C. P. GRAHAM, 68 years old, a dentist at Middletown, Conn., committed suicide Nov. 1, 1904.

WALTER E. JACK, 28 years old, a dentist at Lincoln, Neb., died Nov. 13, 1904, of typhoid fever.

M. H. SNYDER, 60 years old, a dentist at Adrian, Mich., was found dead in his office Oct. 28, 1904.

H. A. JELLY, a dentist of Allentown, Pa., has been very ill with typhoid fever, but is now recovering.

S. W. DICKERSON, 75 years old, a retired dentist at Portland, Ore., died Oct. 13, 1904, of heart disease.

T. E. PARKMAN, 83 years old, a dentist at Rock City Falls, N. Y., died Oct. 24, 1904, of senile diseases.

F. N. SEABURY, a retired dentist of Providence, R. I., 82 years old, died Oct. 19, 1904, at Tiverton, Mass.

ESTELLA G. HOLDREN, 29 years old, a dentist at Rochester, N. Y., died Nov. 4, 1904, after a long illness.

THOMAS K. BREWSTER, 76 years old, a dentist at Oskaloosa, Ia., died Oct. 23, 1904, of septic poisoning.

JOHN G. BROUGHTON, 35 years old, a dentist of New York City, died Nov. 20, 1904, after a long illness.

GEORGE E. WOODBURY, 62 years old, a dentist at Brockton, Mass., died Nov. 15, 1904, after a long illness.

MABEL E. MARSHALL, 24 years old, a dentist at Vacaville, Cal., died of softening of the brain Sept. 25, 1904.

C. P. SAWYER, 64 years old, a dentist at Skowhegan, Me., died Nov. 7, 1904, after a long illness from inflammatory rheumatism.

H. T. TOWAR, 72 years old, a retired dentist at Troy, N. Y., died at Rochester, Nov. 8, 1904, from a sudden attack of hiccoughs.

THRUSH.—A dram of sodium hyphophosphite to an ounce of rose-water make an excellent mouth-wash for thrush.—*Texas Med. News.*

LET'S PLUMB.—The average yearly income of the American doctor is $750. Plumbers get 75 cents an hour, or $6 a day of eight hours. Let's plumb.—*Alk. Clinic.*

NELSON STOW, 76 years old, died at Binghamton, N. Y., Nov. 21, 1904. In 1869 he invented the flexible shaft, on the principle of which our dental engine cables are made.

HEADING HIM OFF. Our primal parent had just taken a good bite of the apple. "Now, Addie," said Eve, "don't tell me that it isn't as good as mother used to make."—*Yale Record.*

LIME WATER AND HYDROGEN DIOXID.—To prevent the acid reaction of hydrogen dioxid, when about to use it mix with an equal volume of lime water. It will be equally effective and not escharotic.—*Register.*

POLISHING A VULCANITE PLATE.—Use aqua ammonia to mix the whiting instead of water, and the result will be more satisfactory. After polishing wash the plate in tepid water and finish with a clean buff wheel.—W. J. ROBINSON, *Stomatologist.*

INDISPENSABLE.—I can't do without the DIGEST.—H. S. Ganson, Nebraska City, Neb. I appreciate the DIGEST very much.—E. K. Douglas, Ladysmith, Wis. The DIGEST is very good.—H. W. Davis, Salt Lake City, Utah. I like the DIGEST very much.—J. A. Robinson, Morrisville, Vt.

"MOULDINE."—Send to a near-by pottery or to the studio of an artist friend and get some wet clay. Add a quantity of glycerin; keep in a tightly-closed can, and you will have "mouldine" always ready for use.—*D. O. and Lab.*

NITRATE OF SILVER IN ROOT-CANAL.—When it is desirable to introduce nitrate of silver into a root-canal, heat a platinum wire and dip it in the crystals. They will adhere and may be carried to any point desired.—J. F. STEELE.

QUEER METHOD OF ADVERTISING.—In a recent issue of a Chicago newspaper the following appeared: "Personal—Silver fillings, 75 cents. Reliable dentist, downtown. J 468, Tribune Office." Perhaps this advertising dentist was ashamed to give his own name.

TO CLEAN AND POLISH GERMAN SILVER.—Anneal by heating to red heat and plunge in a solution of oxalic acid. This cleans and softens the metal better than any method I know of. In polishing use Burneshine or Solarine instead of pumice or whiting.—C. J. HADLEY, *Review.*

PHYSICIAN'S VISITING LIST.—We are in receipt of "The Physician's Visiting List" for 1905, which ranges in price from $1 to $2.25, leather bound, pocket size. Also a special interleaved leatherette-bound general catalogue. Both are from the press of P. Blakiston's Son & Co., Philadelphia.

EXTRACTING FRAIL ROOTS.—If a frail root is filled with a quick-setting cement just before extracting, but allowing time for the cement to set, of course, the danger of crushing with the forceps is lessened. Care should be taken not to force the cement beyond the apex.—A. M. WAAS, *Review.*

TO REPLACE A SINGLE TOOTH IN A DENTURE.—Cut away the part; roughen the surface, and fill the space with vulcanizable gutta-percha. Warm the tooth and press into position and trim away the surplus with a warm spatula. Bury in the flask and vulcanize forty minutes at 320°.—W. A. BROWNLEE, *Dominion.*

PAINFUL WOUNDS.—Wet cotton with a saturated solution of orthoform, dry and keep in a convenient bottle. Useful to pack the alveoli after extraction, to prevent pain, also in pyorrhea pockets, lacerated gums after extracting third molars, etc. It stops pain and hemorrhage and has no bad after-effects.—*Register.*

ARSENICAL DRESSINGS.—Cement should be used for sealing an arsenical dressing in a cavity, as by its use pressure upon the exposed pulp can be better avoided, and its use also prevents the patient from removing the dressing in case the tooth aches. Allow it to remain in place from two to seven days, according to the location of the tooth, the depth of the cavity, the health and age of the patient, etc.—J. P. BUCKLEY, *Review.*

EXTRACTION CAUSES INSANITY.—A recently-landed Italian went to a dental parlor in Lee, Mass., to have a tooth pulled. The dentist was out, so the Italian went out for a drink and returned, repeating this several times. When the dentist came in he pulled the tooth without noticing that the man was intoxicated and without administering an anesthetic. The Italian went out of his head and wrecked the office, it taking four men to subdue him.

CAVITIES IN PORCELAIN TEETH.—With carborundum wheel grind down a pit of suitable size. Make a paste of glycerin, turpentin, and corundum powder, and rub it into the pit, and with copper mandrel drill two retaining points. In this way a cavity can be prepared in a porcelain tooth in five minutes.—J. F. STEELE.

REMOVAL OF GUM TISSUE FROM CAVITY.—Apply trichloracetic acid, which destroys all organic matter (but not inorganic). It does not matter if it should touch the pulp. In a quarter of an hour you can cut away without any pain. In case of difficult eruption of third molars put a few crystals between gum and tooth.—*Cosmos.*

SMALL INLAYS.—To overcome the difficulty of handling small inlays while cementing them in place, fasten the end of a wooden toothpick to the inlay with sticky wax. If the cavity is nearly round, mark the gingival side of the toothpick; this will be a sufficient guide to insure proper placing of the inlay.—ARTHUR E. PECK, *Summary.*

EXPANSION OF GOLD.—After inserting a fine large gold filling, with good undercuts to retain it, I was often surprised when it was finished to see cracks running through the tooth. It took me several years to learn that same were caused by the expansion of the gold by being unduly heated while the filling was being finished—H. P. GRIFFITH, Indiana, Pa.

TOOTHACHE DRIVES MAN INSANE.—Last month a man thirty years old went to a dental parlor in Brooklyn to have a tooth extracted. The tooth was taken out with a little difficulty, and so soon as the man saw the blood he became frantic and it took three men to get him into the police ambulance. A few days under opiates at the hospital restored his peace of mind.

FATALITIES.—A young man at Fall River, Mass., during a fit of laughter swallowed a plate to which four false teeth were attached, and died Nov. 26.—Nov. 5, a man died of heart disease while seated in a dentist's chair in Kansas City, Mo.—Nov. 1, a man died at Oklahoma City as a result of a surgical operation necessitated by his swallowing his false teeth.

NATURAL.—The doctor had suggested that the defect in the anterior part of the mouth be made good by the adjustment of a porcelain-faced crown. The lady hesitated, then asked somewhat dubiously, "Will it look natural, doctor?" "Natural! My dear madam, it will look so natural that you will want all the others cut off and substitutes set to match it!"—*D. O. & L.*

CROWN POSTS.—If you wish to lay up comfort for the future and avoid one of the pitfalls of the whole science, discard every material for posts except platinized gold or platino-iridium. You may be sure that all others will stretch or bend or corrode or do anything they should not do, and for that sin of small economy you will pay dearly.—GEO. F. GRANT, *International.*

FORMALIN IN THE TREATMENT OF ROOT-CANALS.—I have used forty per cent formalin now for over two years for both acute and suppurative conditions of root-canals. In cases of acute suppuration following pulp putrefaction a single dressing left in for twelve hours will invariably stop all active discharge, and at the end of three or four days the roots are quite sweet.—S. P. MUMMERY, *Brit. Dent. Jour.*

REGULATING WITHOUT APPLIANCES.—Where the bicuspids are to be moved forward, or the centrals or laterals spread, I open slightly with separator and place cement between the teeth; when this has hardened I remove the separator and leave the cement in place for several days. Repeat as often as necessary until the teeth attain their proper places. This is not expensive to the patient and causes less annoyance than regulating appliances.—W. H. REABIN.

ALCOHOL IN PORCELAIN WORK.—The best liquid to use for moistening porcelain bodies is alcohol. Because of its rapid evaporation it does not form steam as is the case with water. It can be burned out of the body by holding it close to a flame, without dislodging the porcelain. Denser pieces are secured and more correct shades because of fewer bubbles. Where there are bubbles in the porcelain the shade is thrown off more or less.—I. L. HELMER, *Items.*

ARSENICAL DRESSINGS.—When an arsenical dressing is removed the cavity should be flooded with dialyzed iron and the pulp chamber opened up. Then without any attempt to remove anything seal tannic acid in some form in the cavity for the purpose of constricting and toughening the tissue. When it is essential to avoid discoloration of the tooth the tannic acid should not be used and all traces of the iron should be removed with alcohol.—J. P. BUCKLEY, *Review.*

ACCIDENTS.—Nov. 14, a man in Minneapolis took ether prior to the extraction of a tooth, and it took the dentist and three physicians to revive him.—J. G. Burchell, a dentist at Atlantic City, N. J., was thrown across his operating room and slightly burned by the explosion of a vulcanizer Nov. 5. Some of the office furniture was wrecked.—Oct. 19, a vulcanizer exploded in the office of J. H. Sahler, a dentist at Seneca Falls, N. Y., but no one was hurt.

TREATMENT OF SPECIFIC ULCERS.—In specific ulcers repeated application of the following will produce healthy granulations at the base of the ulcer:

℞—Acidi carbolici,	gr. xv;	
Alcoholis,	℥iv;	
Glycerinæ	℥j;	
Aquæ q.s. ad	ℨiv.	M.

Sig.—To be applied locally.

—*Monthly Cyclopedia of Pract. Med*

PUPILS' TEETH TO BE EXAMINED.—The Rochester (N. Y.) Dental Society and the Rochester Public Health Association are cooperating in a plan to examine the teeth of public-school children free of charge, and to treat them without charge in case the parents are unable to pay. The dentists will not visit the schools, but a certain number will be assigned to each school. On certain days the teachers will notify the children in various grades that they may visit the offices of certain dentists with their parents and have their teeth examined. A chart of the teeth of each child will then be made by the dentist and sent to the parents with comments on the defects present and their remedy.

TIME NOT CHARGED FOR.—A dentist at Oil City, Pa., had an appointment with a patient on a certain day. An hour or two previous he received a telephone message as follows: "Say, Doc, I won't be down to-day. I fell off the top of a forty-foot derrick and am all broke up." The patient recovered from his injuries in a short time and the dental work was resumed, but in view of the naive explanation the dentist did not charge him for the broken appointment.

CONSCIENCE TROUBLED HIM.—Dr. L. Arndt of Jersey City writes as follows: "In the October DIGEST I reported that someone had stolen my diploma which was granted by the New York College of Dentistry. It now develops that same was taken by one of my assistants, who painted over my name with white enamel and put his on top, thinking that he could make use of the diploma in Europe, where he intends to go. His conscience, however, troubled him so that he had to return it."

ACTION OF FORMALDEHYD ON STEEL INSTRUMENTS.—It is claimed to be an advantage of the formaldehyd sterilization that it does not in any way injure even fine-edged instruments. The statement must be taken *cum grano salis.* Any instrument which is not perfectly dry rusts profusely; perfectly dry ones do not seem to suffer if left in only for an hour; left in for days they will rust very decidedly, so that we must conclude a slight action takes place even on dry instruments.—W. D. MILLER, *Cosmos.*

ENGLISH ARMY ADMITS POOR TEETH.—Decayed teeth will no longer prevent the enlistment of otherwise suitable recruits in the British Army. Applicants suffering from poor teeth, however, must be prepared to pay a sum not to exceed $15, or to have same taken out of their pay, for the expense of fitting them with artificial teeth. This will be of benefit all around, as many desirable men will be admitted to the army, and soldiers will no longer be discharged as unfit for further service when their teeth get in bad condition.

REMOVAL OF PUTRESCENT PULPS.—The contents of the canals should be as nearly sterile as antiseptics will make them before removal. The antiseptic used should possess great penetrative power and be applied in such manner as to permit of gradual absorption through capillary attraction with entire absence of pressure. I should recommend the use of formalin, following with hydrogen dioxid or sodium dioxid, which in contact with decomposed organic matter will cause a chemical reaction, with a noticeable effervescence, leaving the debris in a condition that can be easily washed out.—A. F. STRANGE, *Summary.*

RETAINING APPLIANCE.—A simple retaining appliance which combines the requirements of security, cleanliness and comfort is the device of Dr. George C. Ainsworth. It consists of anchor bands with small tubes attached to the buccal sides, into which are inserted the ends of a labial wire bent at right angles to itself, and which is continuous around the arch, thus holding all the teeth that have been moved out, while the labial wire holds the front teeth in. It is securely cemented in and is worn without discomfort, while the labial wire is removable at will, being readily readjusted by the patient.—*International.*

TUBE AND SPLIT-PIN ANCHORAGE FOR CENTRALS OR LATERALS. When one of the centrals is missing a tube is placed in the remaining central and the hooked spur in a gold filling in the lateral, just at the basilar ridge. When a central and lateral are lost a tube is put in the cuspid and the spur in a filling in the remaining central. It also forms an excellent support where the first bicuspid and lateral incisor are gone, the cuspid being tubed and spurs from the dummies resting in the central incisor and second bicuspid. —FRED A. PEESO, *Items.*

FOREIGN BODIES IN THE STOMACH.—I wonder how many brother practitioners know that a gruel made from buckwheat flour will "weave the sack of harmlessness" around any hurtful object that may find lodgment in the stomach, such as nails, pins, needles, bits of glass, etc. I have used the buckwheat for this purpose for thirty years without a single disappointment. The foreign body when recovered is so completely encased that a sharp knife is required to remove the coating. Two or three tablespoonsful of the gruel are sufficient.—*Alkaloidal Clinic.*

TO HARDEN PLASTER CASTS.—Dissolve one part alum (free from iron) in five and a half parts hot water. Immerse the cast and allow to remain from half an hour to several weeks, according to size and bulk. After it has absorbed a sufficient quantity of the solution remove, and from time to time drench with the same solution until a coating of crystalized alum is formed over the entire surface. When thoroughly dry polish with sandpaper, and finish by rubbing with a dry cloth. The product will be a hard, dense mass of fine texture, extremely white, showing a high polish resembling Carrara marble.—*Brit. Jour. Dent. Sci.*

CAVITIES IN MOLARS AND BICUSPIDS SHOULD INCLUDE PART OF OCCLUSAL SURFACE.—As a general rule we may say that all approximal cavities in molars and bicuspids should be made to include the occlusal surface to such an extent that the cavity will be the same size all the way to the gingiva, because the cavity must be filled from the occlusal side; but in incisors and cuspids the operator is left to exercise his own skill in manipulation. The areas of liability in these teeth are so small and are influenced to such a marked extent by surrounding conditions, that unless the tooth-structure has already disintegrated the matter of extension becomes one for gaining access rather than for prevention.—CHARLES E. SLAGLE.

ROBBERIES.—Last month a man at Pine Bluff, Ark., was brought into police court charged with drunkenness. He had no money to pay his fine, and told the judge he did not want to go on the chain gang as he was a dentist and it would ruin his hands. In proof of his statement he produced a pair of forceps, but a little detective work revealed the fact that he had stolen them and other instruments from a dentist in the town.—J. F. Ryder, Moline, Ill., Oct. 29, $15.—J. W. Smith, Rock Island, Ill., Oct. 28, $100.—J. N. Brookins, Anderson, Ind., Oct. 23, $25.—Milton Strauss, Huntington, Ind., Oct. 22, $50.—Henry Taft, Brooklyn, Oct. 25, $40.—J. D. Kinsella, Lockport, N. Y., Oct. 27, $200.—G. J. Mead, Erie, Pa., Oct. 26, $40.—R. T. Gandees, Parkersburg, W. Va., Oct. 22, $25. The thief was arrested.

PROTECTIVE DRESSING FOR PYORRHEAL TEETH.—After cleansing the roots of tartar, etc., and treating them with lactic acid, I dry the parts as perfectly as possible, then rub with alcohol to dry the roots. I then place over the parts bits of Japanese paper saturated with liquid celluloid, so as to form a protecting wall over the roots and edge of the gum. After that is done I wind a thread around and tie it to prevent all possibility of the paper getting out of position. The covering hardens and forms a perfect shield to the granulations, which grow up and fill the spaces between the roots. I have several cases in which the gums are growing in nicely.—W. J. YOUNGER.

FIRES.—O. L. Chestnut, Tifton, Ga., Nov. 4, total loss.—A. C. Clark & Co., Chicago, Nov. 22, loss $10,000, fully insured.—J. A. Grant, Marion, Mich., Nov. 4, total loss, partly insured.—W. T. Smith, Geneva, Neb., Oct. 25, total loss, partly insured.—H. S. Barber, Brooklyn, Nov. 15, loss $1,000.—B. F. Hall, Asheville, N. C., Nov. 20, total loss.—B. W. Jones, Troy, O., Oct. 25, total loss.—R. A. Minton, Claysville, Pa., Oct. 25, total loss.—Hoffman & Reidy, Oil City, Pa., Nov. 7, loss $1,800, no insurance.—W. P. Thomas, San Antonio, Tex., Oct. 26, loss $1,200, insurance $400. The fire started from a defective gasoline torch, and the dentist was severely burned in his efforts to put it out.

RICHES.—

We see men striving for riches,
With hands clutching hard after gold;
We witness the battle of business,
Through methods that scarce can be told.

And we all of us join in the struggle,
Though our methods may vary in kind;
We forget that the greatest of riches
Are found in contentment of mind.—*C. N. Johnson.*

DENTAL EDUCATIONAL IDEALS.—The realm of physics, chemistry, and biology is to be drawn upon in almost every operation of any consequence which we undertake. Can anyone afford, then, not to be familiar with at least the fundamentals of these sciences? And should he not be able to make application of their principles from his own knowledge, rather than, as is too often the case, use the principles in a sort of automatic way, because someone has said cavities should be so formed, or because experience may have taught us that such and such treatment will produce certain results? Is it not true that we do too large a part of our work empirically?—our teachers taught it so, or we found it worked well, and we are satisfied to go on doing it so without stopping to reason out its philosophy, losing thereby one of the greatest benefits and pleasures in life—that of thinking for one's self. Learning for the sake of making a technical application of it is well worth our getting. And while we are getting wisdom and strength of character from learning, should we not also have in view the highest ideals of skill?—N. S. HOFF, *Headlight.*

EXAMINING BOARD AFFAIRS.—October 22, the governor appointed the following as members of the Delaware Board: C. R. Jefferis, R. H. Jones, C. J. Kinkead, S. H. Johns, T. H. Gilpin.—At the October meeting of the Louisiana Board seventeen out of twenty-five applicants were successful in passing the examination.—At the November meeting of the Maryland Board eight applicants were successful in passing the examination.—At the November meeting of the Nebraska Board, eight applicants passed the examination successfully.—At the November meeting of the Oregon Board four out of eleven applicants successfully passed the examination.—At the October meeting of the Utah Board six out of ten applicants passed the examination successfully.—At the November meeting of the Washington Board seven out of twenty-one applicants were successful in passing the examination.

CARE OF CHILDREN'S TEETH.—My first suggested remedy was one that depended upon each professional man's own effort to educate and instruct his patients—a very limited class, and therefore a very limited effort, attended by an equally limited result. The second remedy I would suggest must depend upon nothing less than the help of the state itself. It has to deal with a field so extensive, with numbers so vast, that nothing less than systematic treatment on a large scale can be in any way effectual, and such treatment can be obtained only by having recourse to government assistance. The remedy is really very simple, but in order to be effectual it must be very thorough. Put briefly, it is that the government should appoint dentists to every national school, the duty of each being to give his undivided attention to the children attending the school, so that every child in the school should pass through his hands and obtain the benefit of his attention and skill.—*Treatment.*

TOOTH RESTORATION.—In cases where there is almost complete destruction of the crown of a molar, and the expense of a gold crown is beyond the means of the patient, I offer the following method for restoration: Grind down the walls of the crown to make sufficient space for a substantial cusp. Take an impression and bite with wax or modeling compound, and articulate. After separating build up the crown with plaster and carve the cusps to occlude properly, the same as for a gold crown. Take an impression of the occlusal surface in modeling compound, chill thoroughly, and fill with amalgam. The amalgam must be allowed to set thoroughly, making a solid amalgam cusp. At the next sitting enlarge the pulp-chamber with a large inverted cone bur in the right-angle handpiece, and fill with amalgam which is not too stiff. The amalgam should be built high enough to allow for a surplus when the cusp is in the correct relation. The base of the cusp, which should be made level with a file, is now smeared with soft amalgam and placed in position in the mouth, after which the patient is requested to close the teeth firmly upon it to force it to its proper position. The walls may now be finished with a smooth burnisher, and if quick-setting amalgam has been employed the result is a perfect-occluding, solid amalgam crown and one that will be serviceable. The amalgam can be polished at a future sitting.—W. A. ROBERTSON, *Review.*

TREATMENT OF CAVITIES IN LABIAL AND BUCCAL SURFACES.—In my experience with decay in labial and buccal surfaces of the teeth I have found most trouble with the buccal surfaces of molars, and as we cannot remove the cause before we repair the damage, mechanical skill is the first requirement. Whenever it is possible to replace all of the discolored and softened enamel in these labial and buccal gingival cavities with a proper filling, one will not be apt to have recurrence of decay. But we often find, especially on the buccal surfaces of molars, a complete line of whitened enamel extending from mesial to distal and including part of these surfaces, with but a small place in the central buccal surface where the enamel has broken through and decay of dentin has begun. These cases present a problem, to me at least. All of this whitened portion cannot be cut away, as most of the whitened area will be found very hard except a thin softened layer on the surface, with perfectly healthy dentin underneath. Even with the best of care a perfect margin for filling cannot be obtained, and we know that sooner or later some portion of this white enamel will soften, and decay will come again —possibly not just at the margin of the filling either, but it may be at some little distance on either side. Here is where careful work will show itself.—LEONARD STRANGE, *Summary.*

DAMAGE SUITS.—J. M. Mason, a well-known dentist of Macon, Ga., is suing the street railway of that city for $15,000 damages, alleging that he was permanently disabled by an accident which occurred on one of its cars.—The proprietors of a dental parlor in St. Louis were arrested this month for fighting with the husband of a woman patient from whom one of them had forcibly taken some money.—A young woman in Lincoln, Neb., has brought suit against a dentist of that city, alleging that he took liberties with her while she was in his office.—A woman in Jersey City recently sued a dentist for damages, alleging that he injured her jaw while extracting a tooth, but the court found for the dentist.—A dentist in Syracuse, N. Y., recently sued a patient to recover balance due for services performed, and the patient brought a counter suit, asking for damages and the return of the money which he had paid.—A dentist in Auburn, N. Y., recently sued a patient for a dental bill, and the defendant brought a counter suit, alleging that the work was not properly done, but the jury found for the dentist.—Nov. 17, a dentist at Bellefontaine, O., was arrested on the charge of forcibly taking a set of false teeth from the mouth of the patient who had not paid for same.—Nov. 25, a prominent dentist at Norwalk, O., was sued for $5,000 damages by the mother of a child who alleged that the dentist had injured the child's mouth in extracting some teeth.

MARRIAGES.—L. H. Babcock, a dentist of Canisteo, N. Y., was married to Miss Mary E. Baird of Hornellsville, N. Y., Nov. 15.—Fred G. Crawford, a dentist of Birmingham, Mich., was married to Miss Ethel M. Parkinson of Toronto, Oct. 26.—O. H. Cressler, a dentist of North Platte, Neb., was married to Miss Clara Will of Omaha, Oct. 26.—C. J. R. Engstrom, a dentist of Los Angeles, was married to Miss Mae Lawson of Los Angeles, Oct. 19.—A. F. Felix, a dentist of North Adams, Mass., was married to Miss Frances E.

Slonaker of Baltimore, Oct. 24.—S. W. Gordon, a dentist of Cape Vincent, N. Y., was recently married to Miss Gertrude L. Gordon of Picton, Ont.—Curtis Hamilton, a dentist of Abingdon, Va., was married Oct. 23.—Henry Hoesly, a dentist of New Glarus, Wis., was married to Miss Esther S. Hefty of New Glarus, Nov. 3.—T. J. Holland, a dentist of Manchester, N. H., was married to Miss Anna Griffin of Manchester, Oct. 25.—J. W. Inglis, a dentist of Columbus, was married to Miss Minnie E. Sweet of Fond du Lac, Oct. 26.—E. M. Lambley, a dentist of Conshohocken, Pa., was married to Miss Emma Cresswick of Montreal, Oct. 25.—Howard Mateer, a dentist of Rochester, N. Y., was married to Miss Frances M. Waldert of Rochester, Dec. 6.—J. E. Nelson, a dentist of Portland, Ore., was married to Miss Marion Marble of Sunnyside, Wash., Oct. 26.—John Stetzer, a dentist of Philadelphia, was married to Miss Blanche Finnegan of Philadelphia, Oct. 19.

To My Dentist.—

How I love thee, dentist mine!
Was there ever power like thine?
Power to draw—when aches betide—
Helpless victims to thy side.
Power to draw—with nerve and grace—
Molars from their resting place.
Power to draw—by word and look—
Dollars from my pocketbook.
How I love thy toil-grimed coat,
Cottonoid and creosote;
Drill, and bur, and rusty file,
And above them all, thy smile!
I have never seen thee frown—
Thou shouldst wear a golden crown.
Meek (?) and gentle (?) as a lamb,
Thou art always saying "dam."
And with "cus" thy speech is fraught,
"Pid" is but an afterthought.
Answering patients as they come,
I have heard thee say "by gum!"
Thy sweet antiseptic laugh
Makes men's sufferings less by half.
When for clemency they pray,
'Tis a treat to hear thee say—
"Ah! egg zackly!" Then—sweet dreams,
While thy dental engine screams.

Painful.—

A maiden who lived up in Gloucester,
Felt so bad to have people acoucester
That when a young man
Said: "How are you, Nan?"
She said she had pains all acroucester.—*Houston Post.*